Donaldson
FILTRATION SOLUTIONS

HYDRAULIC & LUBE FILTRATION PRODUCTS

A comprehensive guide to selecting the best solution for clean, dry oil.

High Pressure Filters

Medium Pressure Filters

Low Pressure Filters

High Performance Filtration

Increase dirt-holding capacity and lower ΔP with Donaldson Triboguard™ filters

Off-Line Filtration

Filter carts, filter panels and handheld filtration for any application

Water Removal

Systems and products designed to prevent water ingression and remove entrained water

Vacuum Dehydrators & Coalescers

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

The best solutions for clean, dry oil.

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. Now offering a complete range of contamination control solutions.

Full-Product Range • Innovative Technology • Quick Delivery

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Donaldson Delivers

- Industry's largest selection of in-stock filters.
- Complete range of hydraulic accessories
- Consistent, high-quality performance
- Prompt, accessible customer service
- Expert technical support

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Low Pressure Filters

Our broad line of low pressure hydraulic filters perform optimally in return-line applications with working pressures up to 150 psi/10 bar and static pressures up to 300 psi/ 21 bar.

In-tank and in-line configurations are available to accommodate virtually any industrial application.

Hydraulic Series	Flow Range	Pressure (NFPA/t3.10.17) Working	Static	Porting Types	Media Choices
SP15/25	0-30 gpm 0-114 lpm	150 psi 1034 kPa 10.3 bar	300 psi 2070 kPa 20.7 bar	½", ¾" NPT SAE-8, -12 O-Ring	Synteq® Synthetic Media, Cellulose, Wiremesh, or Water Removal
HBK05	0-60 gpm 0-227 lpm	150 psi 1034 kPa 10.3 bar	250 psi 1724 kPa 17.2 bar	SAE-20 O-Ring 1¼" NPT	Synteq Synthetic Media
SP50/60	0-60 gpm 0-227 lpm	150 psi 1034 kPa 10.3 bar	250 psi 1724 kPa 17.2 bar	1¼" NPT SAE-20 O-Ring	Cellulose, Synteq Synthetic Media, Wiremesh, or Water Removal
SP80/90	0-100 gpm 0-380 lpm	150 psi 1034 kPa 10.3 bar	250 psi 1724 kPa 17.2 bar	1½" NPT, SAE-24 O-Ring 2" SAE Flange	Cellulose, Synteq Synthetic Media, Wiremesh, or Water Removal
SP100/120	0-100 gpm 0-380 lpm	150 psi 1034 kPa 10.3 bar	250 psi 1724 kPa 17.2 bar	1½" NPT	Cellulose, Synteq Synthetic Media, Wiremesh, or Water Removal
TT15/30/60	0-50 gpm 0-190 lpm	100 psi 690 kPa 6.9 bar	150 psi 1030 kPa 10.3 bar	¾", 1½" NPT	Cellulose
FIK	0-211 gpm 0-800 lpm	145 psi 1000 kPa 10 bar	217 psi 1500 kPa 15 bar	SAE-8, -12, -16, -20, -24 O-Ring 2" SAE 4-Bolt Flange	Synteq Synthetic Media, Cellulose, or Wiremesh
FIK Combo	0-79 gpm 0-300 lpm	145 psi 1000 kPa 10 bar	217 psi 1497 kPa 15 bar	Inlet SAE-20 and SAE-16 O-Ring Outlet (2) SAE-16 O-Ring	Synteq Synthetic Media

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HRK-10 Filters

Low Pressure Filters In Use

The HRK-10 low-pressure filters shown at left are used in a 2 x 2 duplex arrangement at a paper manufacturer. The filters are filtering paper machine oil before it is used to lubricate bearings. This type of arrangement allows filter servicing during system operation.

HRK10 features rugged all-steel construction, Donaldson's proprietary Synteq® filter media and unique multi-valve bypass design for superior operating performance.


HRK10

Hydraulic Series	Flow Range	Pressure (NFPA/t3.10.5.1) Working	Static	Porting Types	Media Choices
TI25	0-60 gpm 0-227 lpm	150 psi 1030 kPa 10.3 bar	200 psi 1380 kPa 13.8 bar	1¼" NPT	Synteq® Synthetic Media or Cellulose
HDK06	0-150 gpm 0-568 lpm	350 psi 2413 kPa 24.1 bar	500 psi 3448 kPa 34.5 bar	2½" NPT	Synteq Synthetic Media, or Wiremesh
HFK08	0-300 gpm 0-1136 lpm	350 psi 2413 kPa 24.1 bar	500 psi 3448 kPa 34.5 bar	3" NPT SAE-20 O-Ring	Synteq Synthetic Media, or Wiremesh
HRK10	0-300 gpm 0-1135 lpm	150 psi 1034 kPa 10.3 bar	500 psi 3448 kPa 34.4 bar	4" ANSI Flange	Synteq Synthetic Media, or Wiremesh
W041	0-300 gpm 0-1135 lpm	500 psi 3448 kPa 34.4 bar	1500 psi 10342 kPa 103 bar	SAE-24 O-Ring 2" Code 61 4-Bolt, 2½" Code 61 4-Bolt	Synteq Synthetic Media
W042	0-300 gpm 0-1135 lpm	400 psi 2758 kPa 27.6 bar	1500 psi 10342 kPa 103 bar	3" SAE 4-Bolt Flange	Synteq Synthetic Media

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Medium Pressure Filters

Donaldson's famous Duramax® filters are the highest rated medium pressure filters available in a spin-on configuration.

Duramax filters are reliable, sturdy, long-lived and easy to install. Most often used as return-line filters, they are designed for working pressures up to 1000 psi/69 bar and static pressures up to 2000 psi/138 bar.

Donaldson Duramax spin-on filters protect hydraulic oil in thousands of applications around the world. They are shown on a gas turbine installation in Hungary.

Media choices include: Synteq® (Donaldson's synthetic filter media specially developed for fluid filtration), natural fiber cellulose and stainless steel wiremesh for harsh environments.

Offered in both single-head and dual-head designs to accommodate a broad range of flow ranges.

Hydraulic Series	Flow Range	Pressure (NFPA/t3.10.17) Working	Static	Porting Types	Media Choices
HMK03	0-25 gpm 0-95 lpm	1000 psi 6895 kPa 69 bar	2000 psi 13790 kPa 137.9 bar	SAE-12 O-Ring	Synteq® Synthetic Media
HMK04 HNK04	0-35 gpm 0-130 lpm	500 psi 3448 kPa 34.5 bar	1000 psi 6895 kPa 69 bar	SAE-12, -16 O-Ring ¾", 1" NPT	Synteq Synthetic Media, Cellulose, or Water Removal
HMK05 HNK05	0-50 gpm 189 lpm	350 psi 2413 kPa 24 bar	800 psi 5516 kPa 55 bar	SAE-20 O-Ring 1¼" NPT	Synteq Synthetic Media, Wiremesh, or Water Removal
HMK24 (dual head, two elements)	0-60 gpm 0-230 lpm	500 psi 3450 kPa 34.5 bar	1000 psi 6895 kPa 69 bar	1¼" SAE O-Ring 1¾" SAE 4-Bolt Flange	Synteq Synthetic Media, or Water Removal
HMK25 (dual head, two elements)	0-100 gpm 0-378 lpm	350 psi 2413 kPa 24 bar	800 psi 5516 kPa 55 bar	1½" SAE 4-Bolt Flange SAE-24 O-Ring 1½" NPT	Synteq Synthetic Media, Wiremesh, or Water Removal
W061	0-100 gpm 0-379 lpm	600 psi 4137 kPa 41 bar	1500 psi 10342 kPa 103 bar	SAE-12, -16 O-Ring	Synteq® Synthetic Media

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High Pressure Filters

Donaldson high pressure filters help protect the most expensive components within a hydraulic system, typically the valves and actuators.

Designed with heavy-duty housings for working pressures 2000 - 6000 psi (138-414 bar).

All HPK, FPK & DT filters contain Synteq, a Donaldson proprietary synthetic media.

W451 filters clean the fluid on a hydraulic bench that tests hydraulic pumps, motors and cylinders using our highest performance Donaldson Triboguard™ elements.

Hydraulic Series	Flow Range	Pressure (NFPA/t3.10.5.1) Working	Static	Porting Types	Media Choices
HPK02	0-20 gpm 0-75 lpm	2000 psi 13790 kPa 137.9 bar	4500 psi 31028 kPa 310.3 bar	SAE-12 O-Ring	Synteq® Synthetic Media
FPK02	0-25 gpm 0-95 lpm	6090 psi 42000 kPa 420 bar	9135 psi 63000 kPa 630 bar	SAE-12 O-Ring	Synteq Synthetic Media
HPK03	0-60 gpm 0-227 lpm	3000 psi 20685 kPa 206.9 bar	6000 psi 41370 kPa 413.8 bar	SAE-12, -16 O-Ring	Synteq Synthetic Media or Stainless Steel Wiremesh
FPK04	0-100 gpm 0-379 lpm	4350 psi 300 bar	9135 psi 630 bar	SAE-20 O-Ring	Synteq Synthetic Media
HPK04	0-120 gpm 0-454 lpm	6000 psi 41370 kPa 413.8 bar	12000 psi 82740 kPa 827.6 bar	SAE-20, -24 O-Ring 1¼", 1½" SAE 4-Bolt Flange	Synteq Synthetic Media or Stainless Steel Wiremesh
HPK05	0-200 gpm 0-757 lpm	3000 psi 20685 kPa 206.9 bar	6000 psi 41370 kPa 413.8 bar	2" SAE 4-Bolt Flange	Synteq Synthetic Media
W451	0-150 gpm 0-568 lpm	4500 psi 31028 kPa 310 bar	13500 psi 93083 kPa 931 bar	SAE-24 O-Ring, Manifold Mount, 1½" SAE 4-Bolt Flange, Code 61 1½" SAE 4-Bolt Flange, Code 62	Synteq Synthetic Media
W440	0-20 gpm 0-75 lpm	4000 psi 27580 kPa 276 bar	10000 psi 68950 kPa 690 bar	Manifold Mount	Synteq Synthetic Media
W350	0-50 gpm 0-189 lpm	3000 psi 20685 kPa 207 bar	7500 psi 51713 kPa 517 bar	SAE-12, -16 O-Ring	Synteq Synthetic Media

Comprehensive Line of Replacement Filters

In-Stock & Ready to Ship

Along with our complete line of hydraulic filter heads and housings for low, medium, and high pressure applications, Donaldson offers a comprehensive line of replacement filters. Spin-ons and cartridges are available in your choice of media.

When replacing another filter brand, our comprehensive and up-to-date cross-reference guide (available on our website) can lead you through performance improvement possibilities.

Our worldwide network of **authorized hydraulic distributors** is ready to serve you with their solid knowledge of Donaldson hydraulic filters and vast experience with hydraulic circuits. Most distributors stock our filters, and we have quick-ship programs so that you can get the filter you need, when you need it. To find a distributor near you, access our website and click on Industrial Hydraulics, then on Where to Buy.

Hydraulic Line Accessories

Donaldson hydraulic components are available from your fluid power experts at Donaldson—your one stop shop:

- 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

Pressure Gauges

Test Points

Ball Valves

Port Flanges

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Reservoir Accessories

- Suction Strainers
  - *Line Mount*
  - *Tank Mount*
- Diffusers
  - *Line Mount*
  - *Tank Mount*
- Level Gauges
- Sight Gauges
- Plugs, Caps, Vents
- Filler Breather Assemblies
- Breathers

Introducing Extended Range T.R.A.P.™ Breather Technology!

Protect your pump from damage.

Diffusers are highly effective in reducing aeration, foaming, turbulence and noise caused by return lines.

A variety of Sight & Level Gauges is available. Besides standard length versions, Donaldson has several screw-in styles in plastic and steel for use in a variety of applications.

Donaldson has a wide range of plastic Plugs, Caps & Vents that are great for small power units and gearboxes.

Donaldson Filler Breathers and Caps come in chrome, zinc, epoxy-coated weatherproof finishes and corrosion-resistant technopolymer. Lockable versions, dipsticks and side-mount versions are available.

T.R.A.P.™ (Thermally Reactive Advanced Protection) Breather provides fast-acting protection against airborne moisture and particulate contamination. It stops solid particulate down to 3µm 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.

Donaldson's T.R.A.P. breathers are available in a variety of configurations:

- ABS plastic, nylon or epoxy-coated steel construction
- NPT, BSP, UN straight thread or bayonet connections
- With and without electronic indicator options to fit a broad range of applications

Low Pressure Filters: Where and Why Used

Low pressure filters are the most commonly used type of filter in hydraulic circuits, used most often as return line filters in applications with working pressures up to 1000 *psi*, depending upon model selected.

Digging for Gold

Heavy-duty HBK05 low pressure filters are mounted on an underground railway system in South Africa, at one of the richest gold mines in the world.

Reservoir Accessories

FIK filters with pressure gauges are mounted on the tops of these small reservoirs, destined for use on heavy duty construction equipment.

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Hydraulic Series	Flow Range	Pressure (NFPA/t3.10.17) Working	Static	PortingTypes	Media Choices
SP15/25	0-30 gpm 0-114 lpm	150 psi 1034 kPa 10.3 bar	300 psi 2070 kPa 20.7 bar	½", ¾" NPT SAE-8, -12 O-Ring	Synteq® Synthetic Media, Cellulose, Wiremesh, or Water Removal
HBK05	0-60 gpm 0-227 lpm	150 psi 1034 kPa 10.3 bar	250 psi 1724 kPa 17.2 bar	SAE-20 O-Ring 1¼" NPT	Synteq Synthetic Media
SP50/60	0-60 gpm 0-227 lpm	150 psi 1034 kPa 10.3 bar	250 psi 1724 kPa 17.2 bar	1¼" NPT SAE-20 O-Ring	Cellulose, Synteq Synthetic Media, Wiremesh, or Water Removal
SP80/90	0-100 gpm 0-380 lpm	150 psi 1034 kPa 10.3 bar	250 psi 1724 kPa 17.2 bar	1½" NPT, SAE-24 O-Ring 2" SAE 4-Bolt Flange	
SP100/120	0-100 gpm 0-380 lpm	150 psi 1724 kPa 10.3 bar	250 psi 1034 kPa 17.2 bar	1½" NPT	Cellulose, Synteq Synthetic Media, Wiremesh, or Water Removal
TT15/30/60	0-50 gpm 0-190 lpm	100 psi 690 kPa 6.9 bar	150 psi 1030 kPa 10.3 bar	¾", 1½" NPT	Cellulose
FIK	0-211 gpm 0-800 lpm	145 psi 1000 kPa 10 bar	217 psi 1500 kPa 15 bar	SAE-8, -12, -16, -20, -24 O-Ring 2" SAE 4-Bolt Flange	Synteq Synthetic Media, Cellulose, or Wiremesh
FIK Combo	0-79 gpm 0-300 lpm	145 psi 1000 kPa 10 bar	217 psi 1497 kPa 15 bar	Inlet SAE-20 and SAE-16 O-Ring Outlet (2) SAE-16 O-Ring	Synteq Synthetic Media
TI25	0-60 gpm 0-227 lpm	150 psi 1030 kPa 10.3 bar	200 psi 1380 kPa 13.8 bar	1¼" NPT	Synteq Synthetic Media or Cellulose
HDK06	0-150 gpm 0-568 lpm	350 psi 2413 kPa 24.1 bar	500 psi 3448 kPa 34.5 bar	2½" NPT	Synteq Synthetic Media, or Wiremesh
HFK08	0-300 gpm 0-1136 lpm	350 psi 2413 kPa 24.1 bar	500 psi 3448 kPa 34.5 bar	3" NPT SAE-20 O-Ring	Synteq Synthetic Media, or Wiremesh
HRK10	0-300 gpm 0-1135 lpm	150 psi 1034 kPa 10.3 bar	500 psi 3448 kPa 34.4 bar	4" ANSI Flange	Synteq Synthetic Media, or Wiremesh
W041	0-300 gpm 0-1135 lpm	500 psi 3448 kPa 34.4 bar	1500 psi 10342 kPa 103 bar	SAE-24 O-Ring 2" Code 61 4-Bolt 2½" Code 61 4-Bolt	Synteq Synthetic Media
W042	0-300 gpm 0-1135 lpm	400 psi 2758 kPa 27.6 bar	1500 psi 10342 kPa 103 bar	3" SAE 4-Bolt Flange	Synteq Synthetic Media

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 'n Match system of in-stock heads & elements, so you can get exactly what you need. Likewise, choose the media type and configuration 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 $ß_{6(c)}$=1000

Porting Sizes
- ½", ¾" NPT or ½", ¾" 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 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
- 2.2 lbs / 1 kg (approx.)

Operating Temperatures
- -20°F to 225°F / -27°C to 107°C

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

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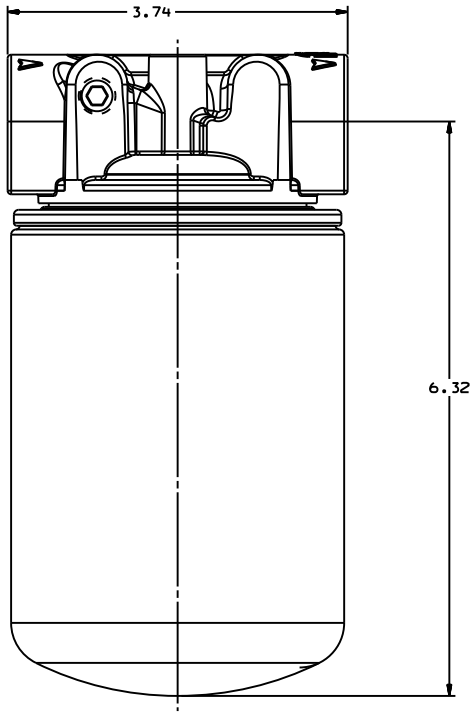
Element Dimensions

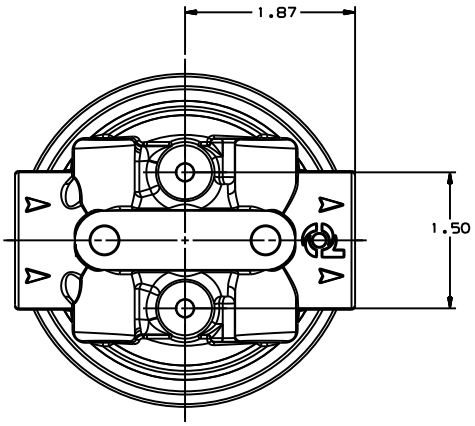
Applications:

In-Plant Systems
Ag Equipment
Mining
Construction
Logging



For available element lengths, see page 12.

Head Dimensions



All dimensions above are shown in inches [millimeters]

SP15/25 Components

Element Choices

Media Type	$Beta_{x(c)}$=200 Rating	$Beta_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
Cellulose Media # 3		24	5.35/136	P565061	
Cellulose Media # 10		23	5.35/136	P562198	
Cellulose Media # 10		23	7.87/200	P565059	
Synteq Media # 2		9	7.87/200	P564357	Synthetic Media
Synteq Media # 2-1/2		10	5.35/136	P560693	Synthetic Media
Synteq Media # 2-1/2		10	7.87/200	P179089	Synthetic Media
Synteq Media # 2-1/2		10	5.35/136	P566040*	Plurasafe® EnBio TC® S
Synteq Media # 2-1/2		10	7.87/200	P566042*	Plurasafe® EnBio TC® S
Synteq Media # 9		23	5.35/136	P560694	Synthetic Media
Synteq Media # 1		6	5.35/136	P564967	Synthetic Media
Synteq Media # 1		6	7.87/200	P567849	Synthetic Media
Cellulose Media # 25	32		5.35/136	P562199	
Cellulose Media # 25	32		7.87/200	P565060	
Water absorbing Media	32		5.35/136	P565062	Absorbs Approx. 6 oz/170 ml of water @ 20 psid/1.4 bar
Wiremesh Media # 149	150		5.35/136	P550274	

* Compatible with Plurasafe® EnBio TC® S (poly alkylene glycol) fluids. Plurasafe EnBio TC S is a trademark of BASF and EnBio Industries, Inc.

Head Choices for SP15/25

Port Size	Bypass Range	Gauge ports (drill, tap, plug)	Gauge Port Location	DCI 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 'n Match

Donaldson's Mix 'n 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.

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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 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

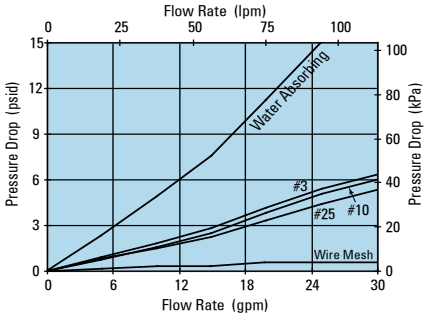
Notes

* NOT PRESET: Setting adjustable for desired application.

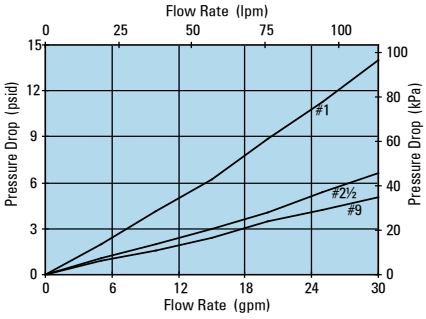
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

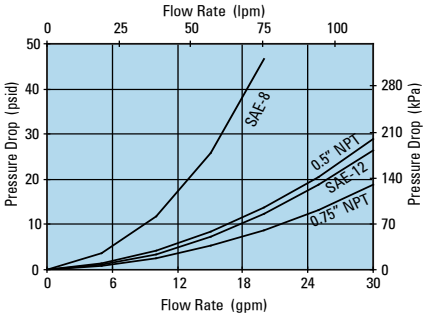
SP15 Filter Only
(Cellulose, 5.35"/136mm)



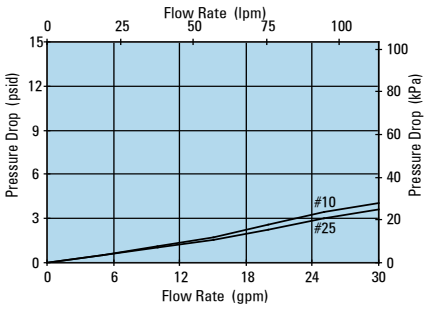
SP15 Filter Only
(Synthetic, 5.35"/136mm)



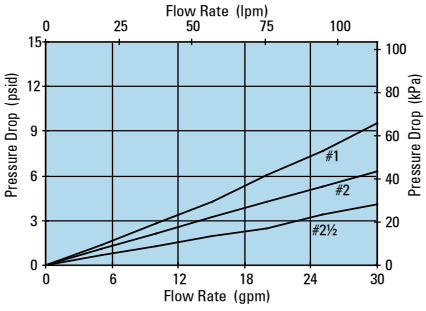
SP15/25 Head Only



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



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



HBK05 Spin-On Filter

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*

Synteq®

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, and 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 'n Match system of in-stock heads and elements—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 elements ship with "L", square, and o-ring gaskets unless noted with Viton seals, then with square and o-ring gaskets. All HBK05 elements are interchangeable with SP50/60, SP80/90 and SP100/120 spin-ons, and have 1½" - 16 UN threads.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Porting Sizes
- 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

Element Collapse Ratings
- 125 *psid* / 863 kPa / 8.6 bar

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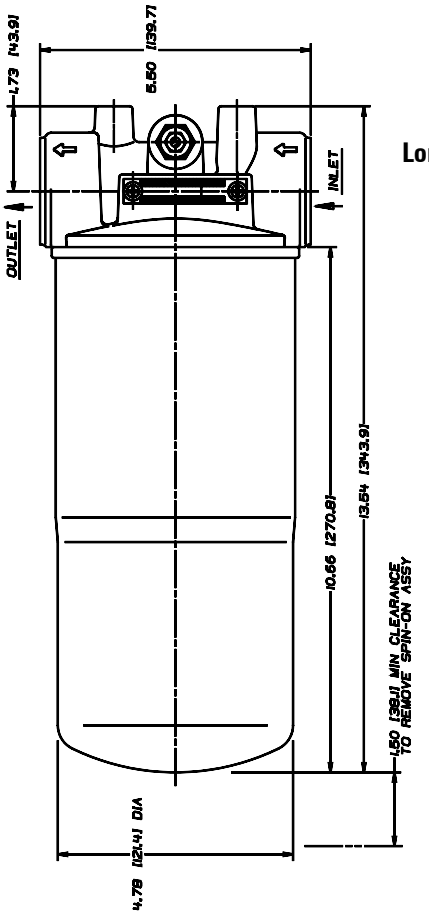
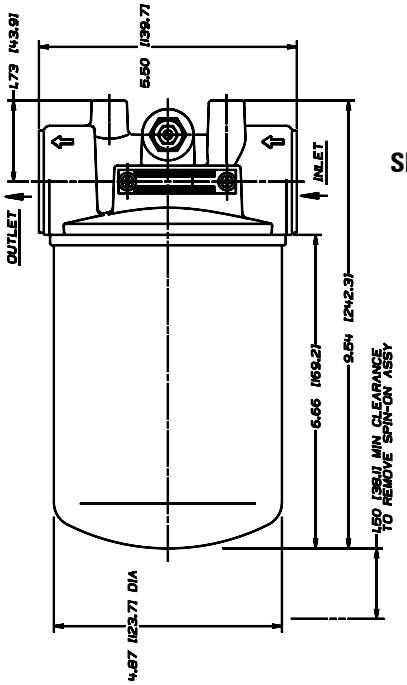
Assembly - Side View



Long Assembly



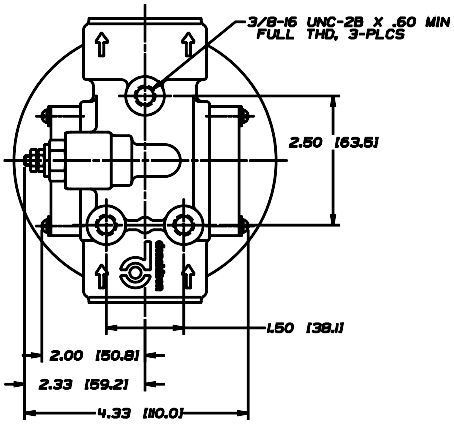
Short Assembly

Applications:

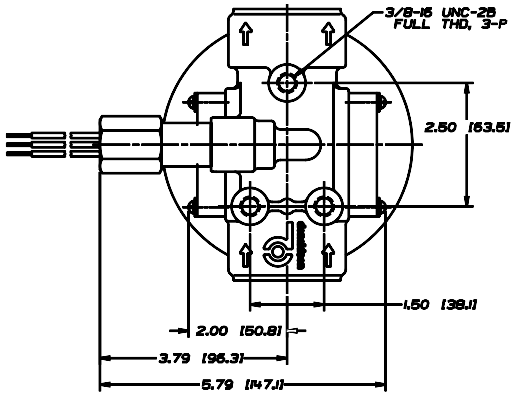
- Fluid Conditioning
- Return-Line/Side-Loop
- Hydrostatic Charge Pump Suction
- Lube Oil & Process Systems
- Power Transmissions
- Cooling Circuits

Head - Top View

with DC Electrical Service Indicator



with AC/DC Electrical Service Indicator



All dimensions above are shown in inches [millimeters]

HBK05 Components

Spin-On Element Choices

Media Rating	$B_{x(c)}$ = 1000	Length (in.)	(mm)	Part No.
No. ½	<4 µm	10.7	271	P167796 with Viton Seal
No. 1	6 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. 2½	10 µm	6.7	170	P566043*
		10.7	271	P566044*
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

* Compatible with Plurasafe® EnBio TC® S (poly alkylene glycol) fluids. Plurasafe EnBio TC S is a trademark of BASF and EnBio Industries, Inc.

Mix 'n Match System

Donaldson's Mix 'n 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 spin-ons are interchangeable with SP50/60 spin-ons. See page 20.

Head Choices

Port Size	Bypass Rating	Indicator Style & Location	Part No.
1¼" NPT	50 psi 345 kPa	Visual, Both Sides	P172953
1¼" NPT	25 psi 172 kPa	Visual, Both Sides	P166418
1¼" NPT	5 psi 34 kPa	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.

Synteq®

What's so special about Donaldson-developed Synteq® synthetic filter media? Go to page 240 to find out.

Service Indicator Options

Electric Models[1]

Use with Bypass Valve Pressure of:	Indicator Part No.	Style[3]	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)[2]

Use with Bypass Valve Pressure of:	Indicator Part No.	Style[3]
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

(1) All electric models have a maximum operating temperature of 250°F/ 121°C.

(2) All non-electric models have a maximum operating temperature of 180°F/ 82°C.

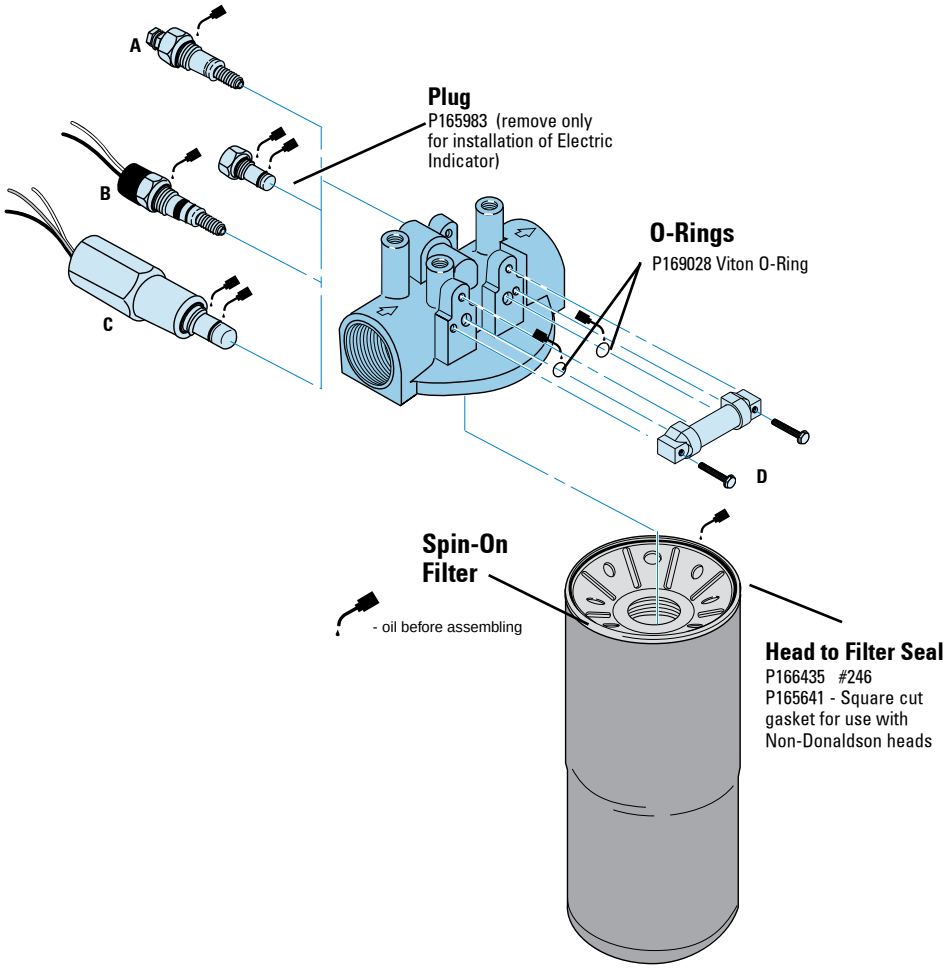
(3) See indicator illustrations on facing page.

HBK05 Service Parts

Service Indicator Styles
(See table on opposite page)

Filter Notes

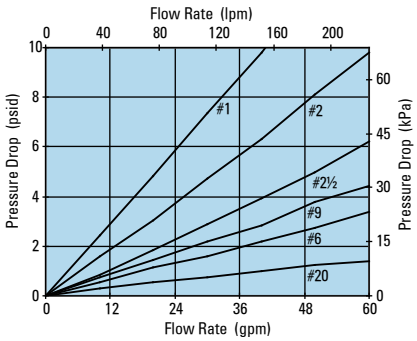
- If you're filtering petroleum-based oil, filters with seals made of BunaN are appropriate for most applications.
- If you're filtering diester, phosphate ester fluids, water glycol, water/oil emulsions and HWCF over 150°F/ 83°C, use filters with seals made of fluorocarbon, such as Viton® from DuPont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



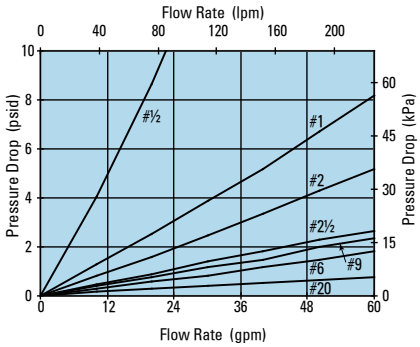
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

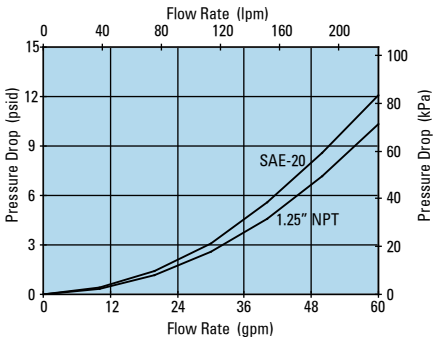
HBK05 Filter Only
(Synthetic, 6.7"/170mm)



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



HBK05 Head Only



SP50/60 Spin-On Filter

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 'n Match system of in-stock heads and element choices—so you can get exactly what you need. Element 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 16. Please note gasket options on page 20.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Porting Sizes
- 1¼" NPT
- SAE-20 (1¼") O-Ring

Replacement Filter Lengths
- 6.7" / 170 *mm*
- 10.7" / 271 *mm*

Outer Diameter
- 5" / 127 *mm*

Element 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

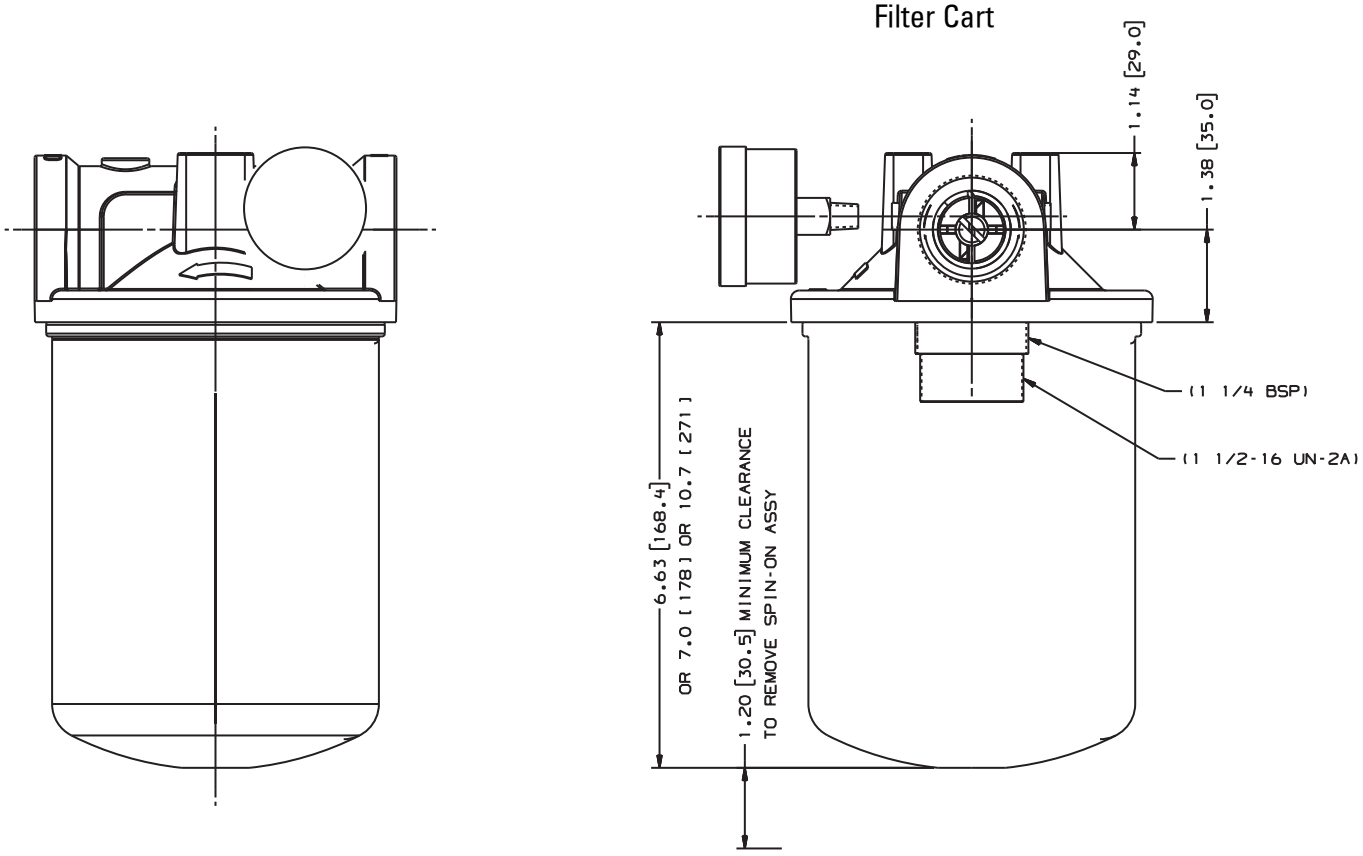
Assembly Weight
- 4.7 lbs / 2.1 kg (short)
- 5.6 lbs / 2.5 kg (long)

Operating Temperatures
- -22°F to 250°F / -30°C to 121°C

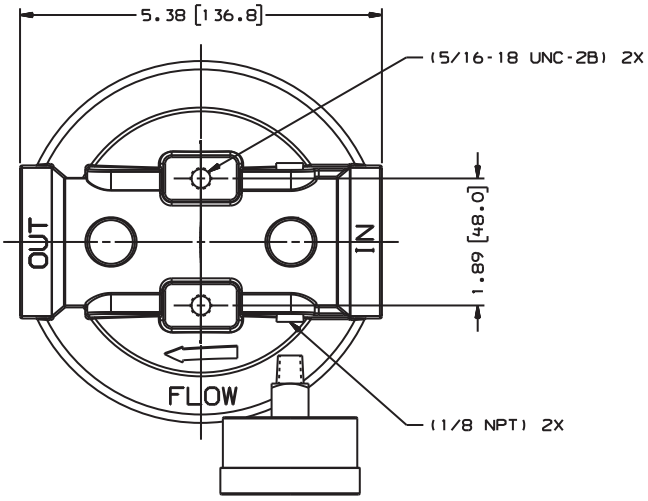
Assembly - Side View

Applications:

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



Head - Top View



All dimensions above are shown in inches [millimeters]

SP50/60 Components

Element Choices

Media Type	Beta$_{x(c)}$=200 Rating	Beta$_{x(c)}$=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		6 µm	6.7/170	P169430	Synthetic, 3-seal kit
			6.7/170	P562209	Synthetic, "L" & square-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
			6.7/170	P562207	Synthetic, "L" & square-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
			10.7/271	P562208	Synthetic, "L" & square-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
			6.7/170	P562200	Cellulose, "L" & square-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. 10		23 µm	6.7/170	P562201	Cellulose, "L" & square-seal kit
			10.7/271	P562204	Cellulose, "L" & square-seal kit
			7.00/178	P550148	Cellulose, square-seal, 1¼" BSP thread
No. 25	32 µm		6.7/170	P550387	Cellulose, 3-seal kit
			6.7/170	P562202	Cellulose, "L" & square-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1¼" BSP thread
			10.7/271	P562205	Cellulose, "L" & square-seal kit
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
			6.7/170	P562203	SS Wire Mesh, "L" & square-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 24 oz./700 ml water

Head Choices for SP50/60

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 elements 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:

P170894 L Shaped

Use with Donaldson LPS05 head. Shipped with each Donaldson-branded spin-on element.

P165641 Square Cut

Use with SP50/60 and non-Donaldson head. Shipped with each Donaldson- and LHA-branded spin-on element.

P166435 O-Ring -246

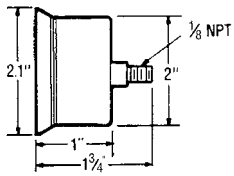
Use with Donaldson HBK05 head. Shipped with each Donaldson-branded spin-on element.

Donaldson

Optional Filter Service Indicators

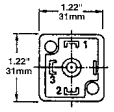
This handy pressure gauge, mounted on the side of an SP50/60 filter head, will tell you when it's time to service the filter element.

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

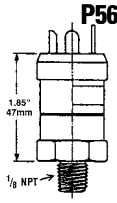


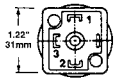
Notes

*NOT PRESET: Setting adjustable for desired application

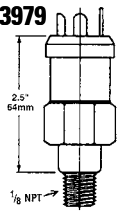


P563978





P563979



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

Instructions

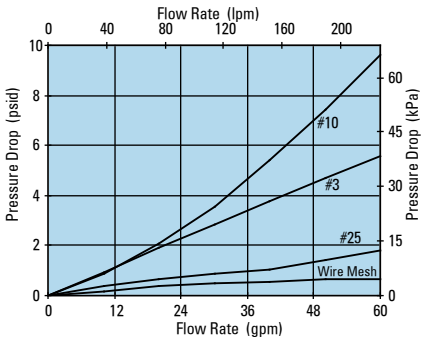
1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

Adjustment screw located in center of elec. prongs

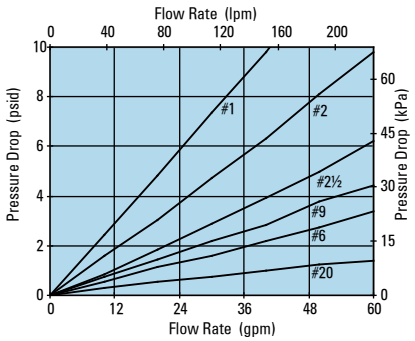
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

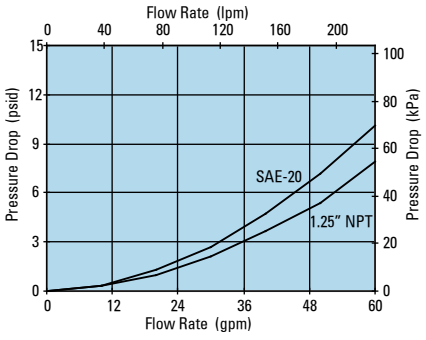
SP50 Filter Only
(Cellulose, 6.7"/170mm)



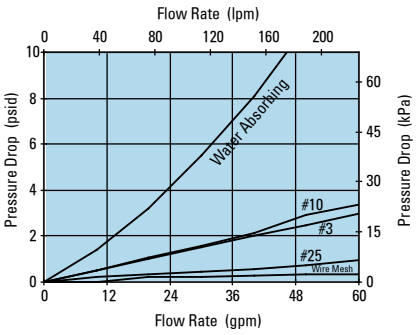
SP50 Filter Only
(Synthetic, 6.7"/170mm)



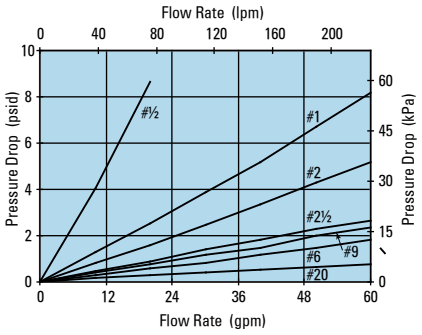
SP50/60 Head Only



SP60 Filter Only
(Cellulose, 10.7"/271mm)



SP60 Filter Only
(Synthetic, 10.7"/271mm)



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

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Porting Sizes
- 1½" NPT, 2" SAE Flange, SAE-24

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

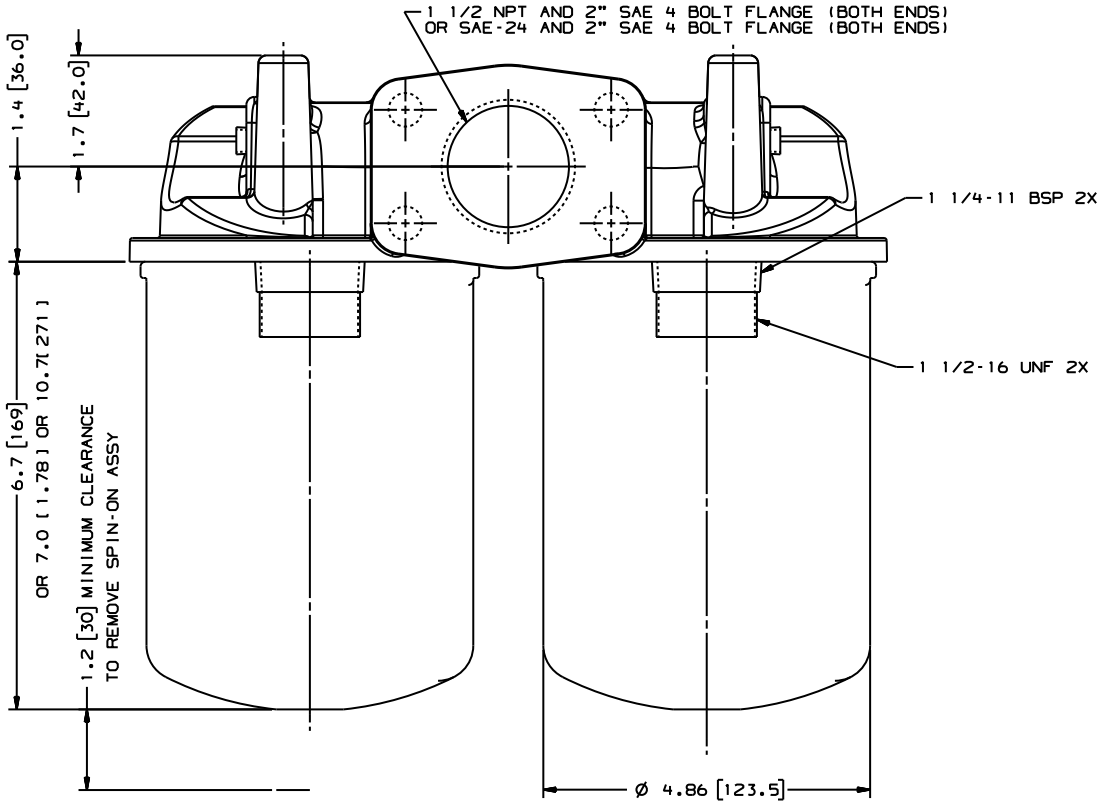
Operating Temperatures
- -22°F to 250°F / -30°C to 121°C

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

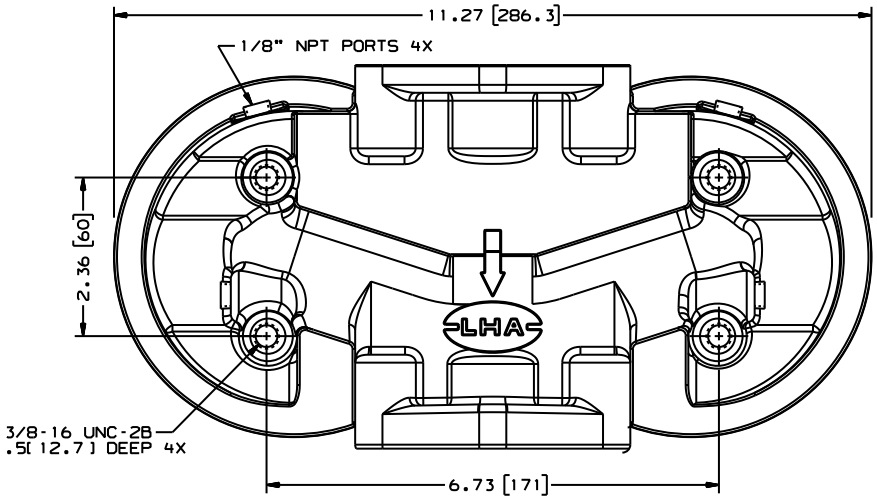
Donaldson

Assembly - Side View

Combination
1½" NPT and 2" SAE
4 Bolt Flange (Both Ends) or
SAE-24 & 2" SAE 4 Bolt



Head - Top View



All dimensions above are shown in inches [millimeters]

SP80/90 Components

Element Choices

Media Type	Beta$_{x(c)}$=200 Rating	Beta$_{x(c)}$=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		6 µm	6.7/170	P169430	Synthetic, 3-seal kit
			6.7/170	P562209	Synthetic, "L" & square-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
			6.7/170	P562207	Synthetic, "L" & square-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
			10.7/271	P562208	Synthetic, "L" & square-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
			6.7/170	P562200	Cellulose, "L" & square-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. 10		23 µm	6.7/170	P562201	Cellulose, "L" & square-seal kit
			10.7/271	P562204	Cellulose, "L" & square-seal kit
			7.00/178	P550148	Cellulose, square-seal, 1¼" BSP thread
No. 25	32 µm		6.7/170	P550387	Cellulose, 3-seal kit
			6.7/170	P562202	Cellulose, "L" & square-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1¼" BSP thread
			10.7/271	P562205	Cellulose, "L" & square-seal kit
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
			6.7/170	P562203	SS Wire Mesh, "L" & square-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 24 oz./700 ml water

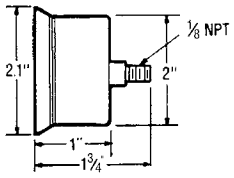
Head Choices for SP80/90

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

Donaldson

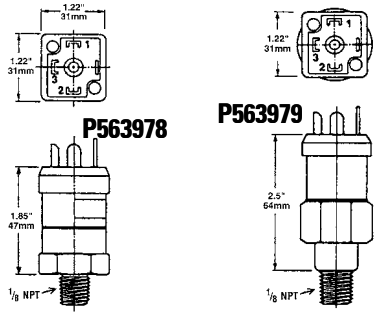
Optional Filter Service Indicators

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

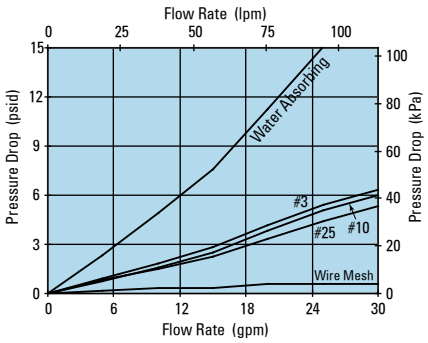
1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

Adjustment screw located in center of elec. prongs

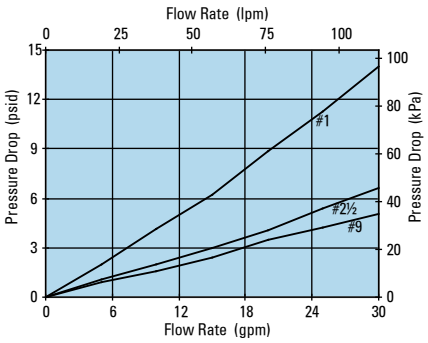
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

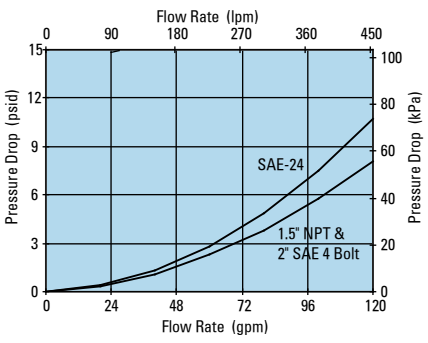
SP80 Filter Only
(Cellulose, 6.7"/170mm)



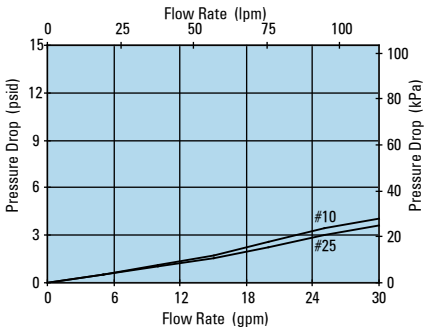
SP80 Filter Only
(Synthetic, 6.7"/170mm)



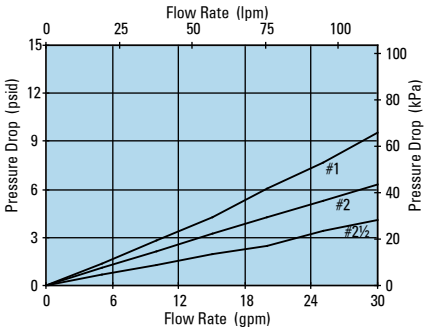
SP80/90 Head Only
SP80 Head Only



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



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



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

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Porting Sizes
- 1½" NPT

Replacement Filter Lengths
- 6.7" / 170 *mm*
- 7.0" / 178 *mm*
- 10.7" / 271 *mm*

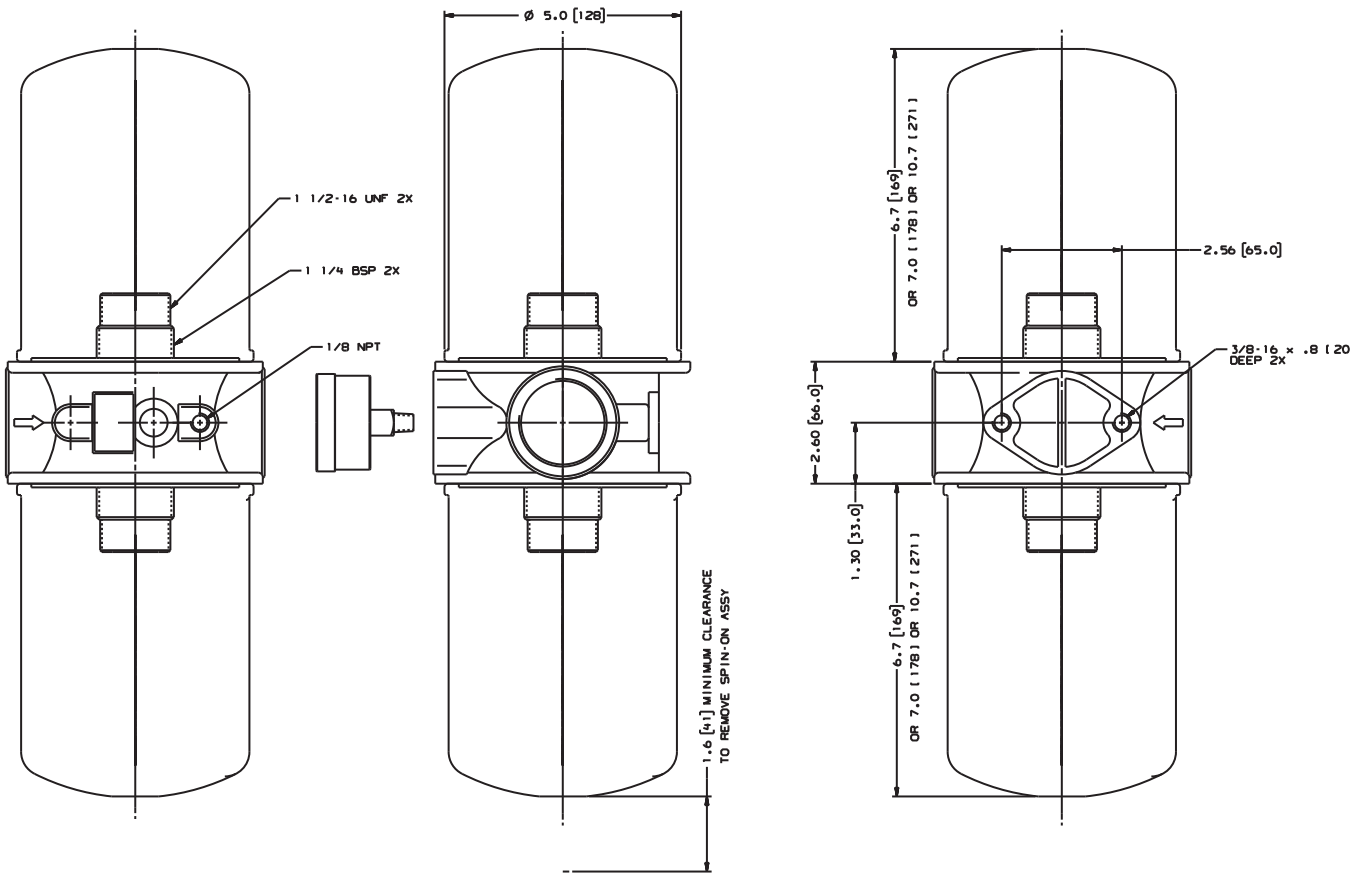
Standard Bypass Ratings
- 25 psi / 172.5 kPa / 1.72 bar

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)

Donaldson

Assembly - Side View



All dimensions above are shown in inches [millimeters]

SP100/120 Components

Element Choices

Media Type	Beta$_{x(c)}$=200 Rating	Beta$_{x(c)}$=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		6 µm	6.7/170	P169430	Synthetic, 3-seal kit
			6.7/170	P562209	Synthetic, "L" & square-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
			6.7/170	P562207	Synthetic, "L" & square-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
			10.7/271	P562208	Synthetic, "L" & square-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
			6.7/170	P562200	Cellulose, "L" & square-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. 10		23 µm	6.7/170	P562201	Cellulose, "L" & square-seal kit
			10.7/271	P562204	Cellulose, "L" & square-seal kit
			7.00/178	P550148	Cellulose, square-seal, 1¼" BSP thread
No. 25	32 µm		6.7/170	P550387	Cellulose, 3-seal kit
			6.7/170	P562202	Cellulose, "L" & square-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1¼" BSP thread
			10.7/271	P562205	Cellulose, "L" & square-seal kit
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
			6.7/170	P562203	SS Wire Mesh, "L" & square-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 24 oz./700 ml water

Head Choices for SP100/120

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

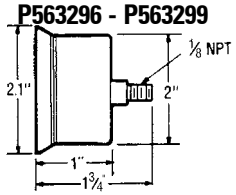
Donaldson

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 element.

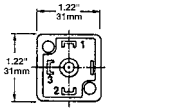
Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563979	-5 to 15 in Hg field adj.*	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, electrical
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

P563296 - P563299

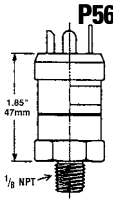


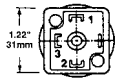
Notes

* NOT PRESET: Setting adjustable for desired application.

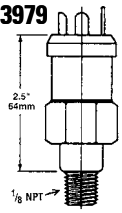


P563978





P563979



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

Instructions

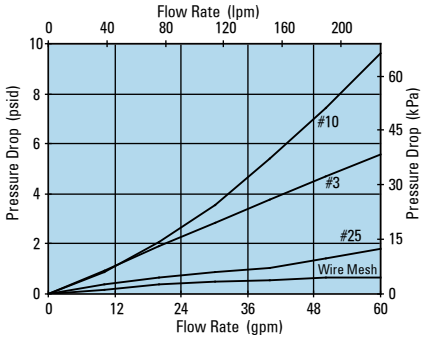
1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

Adjustment screw located in center of elec. prongs

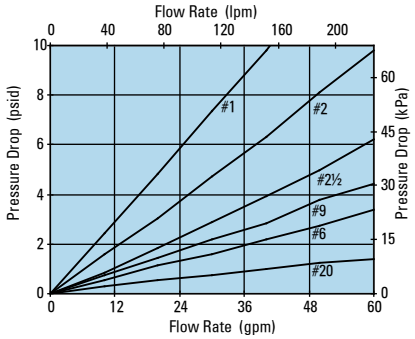
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

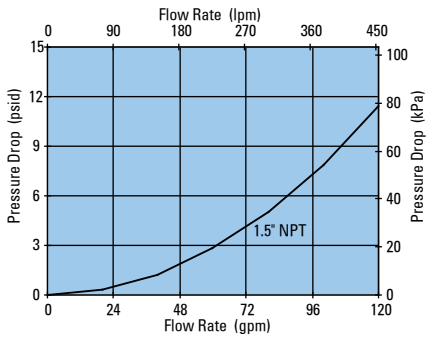
SP100 Filter Only
(Cellulose, 6.7"/170mm)



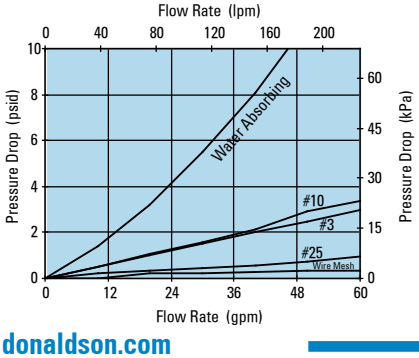
SP100 Filter Only
(Synthetic, 6.7"/170mm)



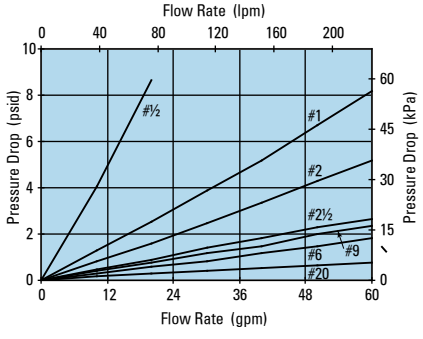
SP100/120 Head Only



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



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



TT15/30/60 Spin-On Tank Top Return 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 element provides a new bypass valve and anti-drainback valve for easy element change.

Beta Rating
- Performance to $ß_{23(c)}$=1000

Porting Sizes
- ¾" NPT, 1½" NPT

Replacement Filter Lengths
- 5.83" / 148*mm* TT15
- 7.05" / 179*mm* TT30
- 9.29" / 236*mm* 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

Element Choices

Media Type	Beta$_{x(c)}$=1000	Length Rating	Donaldson (in./mm)	Element Part #	Description Thread
10 Micron Nominal Cellulose	23 µm	5.36 / 136	P565242	¾" BSP	TT15 Series
10 Micron Nominal Cellulose	23 µm	7.05 / 179	P550269	1¼" BSP	TT30 Series
10 Micron Nominal Cellulose	23 µm	9.29 / 236	P171640	1¼" BSP	TT60 Series

Donaldson

Head Choices for TT15/30/60

Port Size	Bypass Rating*	Gauge Ports (drill, tap, plug)	Gauge Port Location	DCI Part No.	Description	Head to Tank** Seal Part No.
¾" NPT	22 psi / 150 kPa / 1.5 bar	(2) 1/8" NPT	upstream side	P564038	TT15 Series	P563975
1½" 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

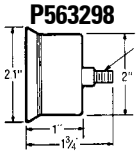
Notes

* NOT PRESET: Setting adjustable for desired application.

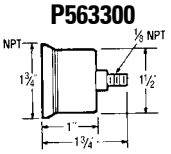
1/8" - 27 NPTF threads

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

P563298



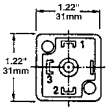
P563300



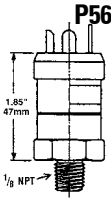
Instructions

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



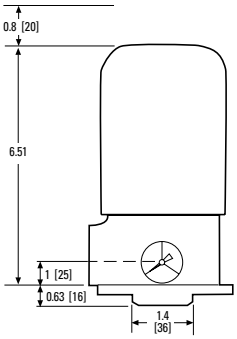
P563978



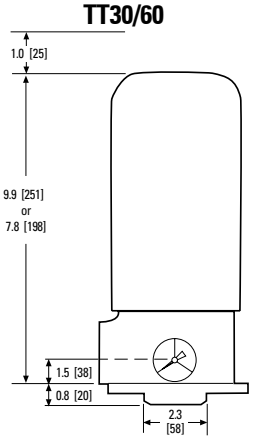
Adjustment screw located in center of elec. prongs

Assembly - Side View

TT15



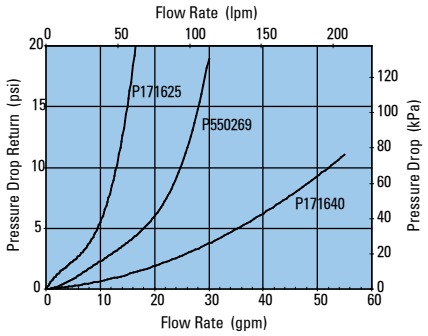
TT30/60



Performance Data

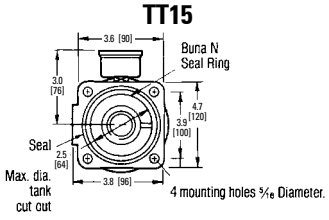
For a full explanation of how our performance curves were derived, see page 228.

FIK Suction / Return Combo Flow Curves

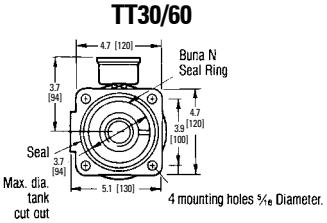


Head - Top View

TT15



TT30/60



All dimensions above are shown in inches [millimeters]

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. Element 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 $ß_{8(c)}$=1000

Porting Sizes
- SAE-8, -12, -16 and -20 (low flow)
- SAE-16, -20, -24 O-Ring and 2" SAE 4-Bolt Flange (high flow) 1/2", 3/4" 1" NPT

Standard Bypass Ratings
- 22 *psi* / 150 kPa / 1.5 bar

Operating Temperatures
- -4°F to 194°F / -20°C to 90°C

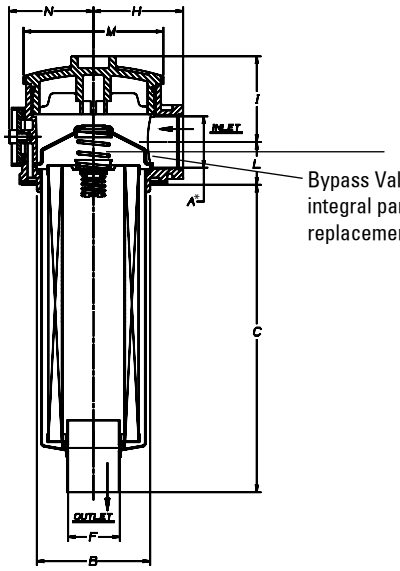
Collapse Ratings
- 145 *psid* / 1000 kPa / 10 bar

Donaldson

Assembly - Side View

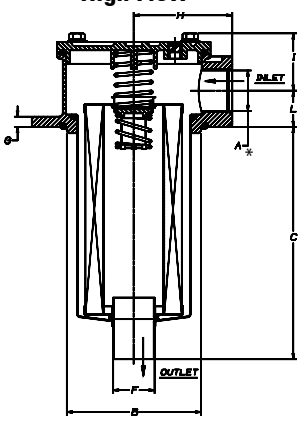
Low Flow

Optional air breather mounts here



Bypass Valve is an integral part of the replacement filter.

High Flow



Applications:

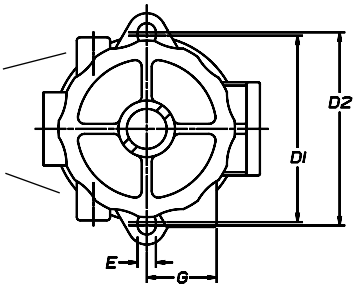
- Return Lines
- Side Loop Systems
- Fluid Conditioning Systems
- Process Systems
- Cooling Circuits
- Lube Oil Systems

• All dimensions above are shown in inches [millimeters]
NOTE: * For "A" dimensions see next page.

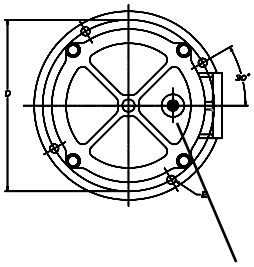
Head - Top View

FIK-030319, FIK-040811, FIK-040812, FIK-040813, FIK-041769, FIK-041770

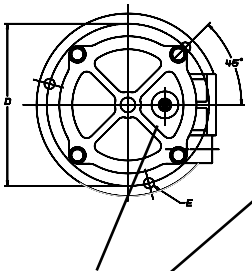
Port for service indicator (G1/8")



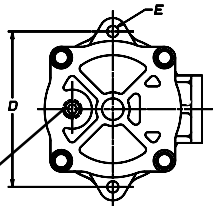
FIK-070248, FIK-070249, FIK-070250, FIK-071001, FIK-071002, FIK-071003



FIK-051204, FIK-052053



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



Port for Service Indicator (G1/8")

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	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
C	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
D1	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
D2	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
E	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
F	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
G	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
H	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
I	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
L	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
M	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
N	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
Weight	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 Assemblies & Service Parts

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

Note

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

Filter Notes

- FIK elements utilize either glass fiber, cellulose, or wire mesh media.
- All FIK elements are potted with polyurethane adhesives.
- Synteq media designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- BunaN seals are standard on all FIK elements.

Service Indicators

Pressure Gauges
P171956
G ⅛
(center back)

P171953
G ⅛
(bottom mount)
-14.5 to 72 psi
-1 to +5 bar

DC Electrical Indicator
P171966
17 psi
1.2 bar

Visual Indicator
P171958
17 psi
1.2 bar

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.

Replacement Element Choice - Low Flow

Media Type	Beta Rating	K030319	K040811	K040812	K040813
Synteq	ß8 = 1000	P569273	P569274	P569275	P569276
Synteq	ß11 = 1000	P171845	P171525	P171531	P171846
Synteq	ß23 = 1000	P171842	P171526	P171532	P171843
Cellulose	ß36 = 1000	P171839	P171527	P171533	P171840
Cellulose	ß40 = 1000	P171836	P171528	P171534	P171837
Wire Mesh	60 µm	P171833	P171529	P171535	P171834
Wire Mesh	90 µm	P171830	P171524	P171530	P171831

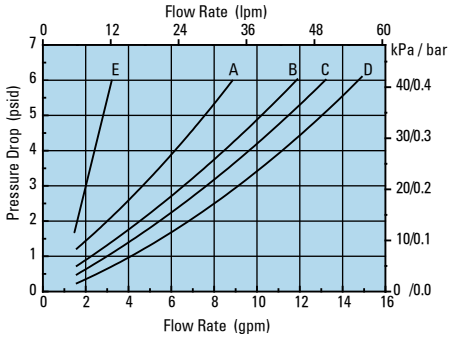
Replacement Element Choice - High Flow

Media Type	Beta Rating	K031027	K041769 K041770	K040799 K041771 K041772 K041773 K041774	K051204 K052053	K070248 K071001	K070249 K071002	K070250 K071003
Synteq	ß8 = 1000	P569277	P569274	P569275	P569278	P569279	P569280	P569281
Synteq	ß11 = 1000	P171501	P171525	P171531	P171537	P171555	P171573	P171579
Synteq	ß23 = 1000	P171502	P171526	P171532	P171538	P171556	P171574	P171580
Cellulose	ß36 = 1000	P171503	P171527	P171533	P171539	P171557	P171575	P171581
Cellulose	ß40 = 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

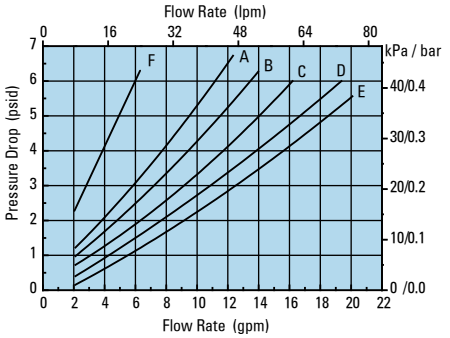
For a full explanation of how our performance curves were derived, see page 228.

K030319 Assembly



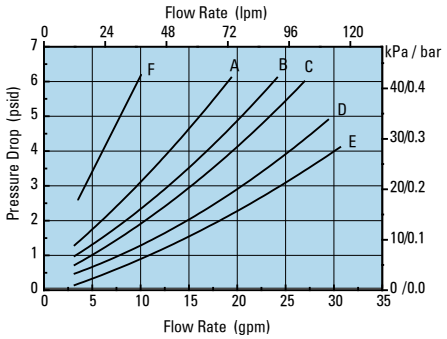
Service Element Part Numbers
A. P171845 (Synthetic)
B. P171839 (Cellulose)
C. P171836 (Cellulose)
D. P171833, P171830 (Wiremesh)
E. P569273 (Synthetic)

K040811/K041769/K041770* Assembly



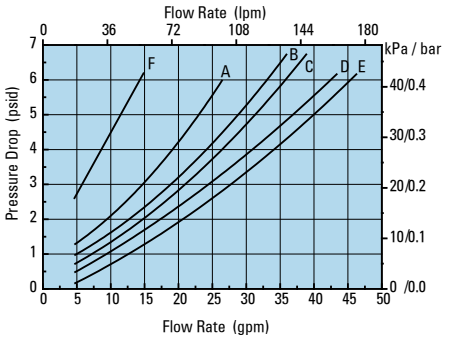
Service Element Part Numbers
A. P171525 (Synthetic)
B. P171526 (Synthetic)
C. P171527 (Cellulose)
D. P171528 (Cellulose)
E. P171529, P171524 (Wiremesh)
F. P569274 (Synthetic)

K040812 Assembly



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

K040813 Assembly



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

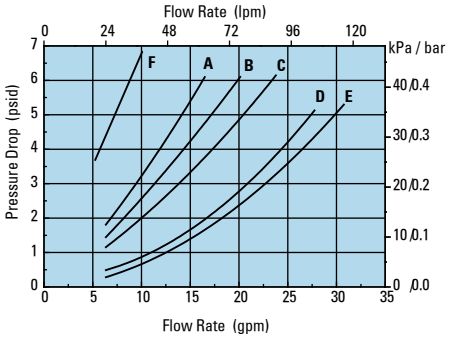
NOTE:
* subtract ½ psi
** add ½ psi

Donaldson.

Performance Data

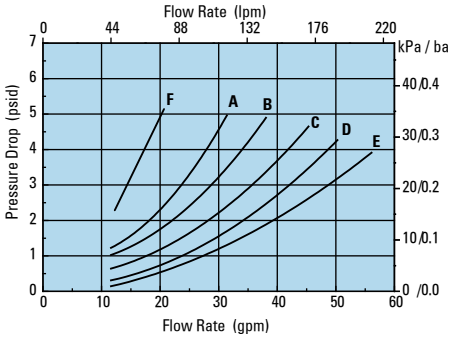
For a full explanation of how our performance curves were derived, see page 228.

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



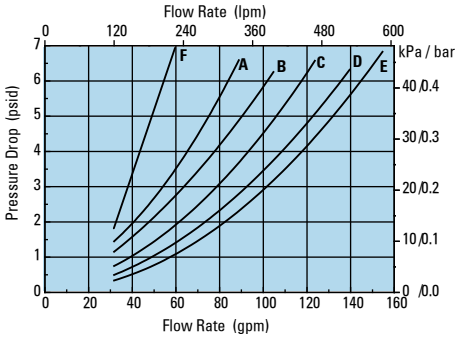
Service Element Part Numbers
A. P171531 (Synthetic)
B. P171532 (Synthetic)
C. P171533 (Cellulose)
D. P171534 (Cellulose)
E. P171535, P171530 (Wiremesh)
F. P569275 (Synthetic)

K051204/K052053 Assembly



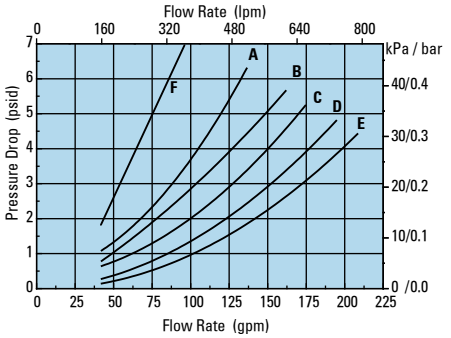
Service Element Part Numbers
A. P171537 (Synthetic)
B. P171538 (Synthetic)
C. P171539 (Cellulose)
D. P171540 (Hvy Duty Cellulose)
E. P171541, P171536 (Wiremesh)
F P569278 (Synthetic)

K070249/K071002 Assembly



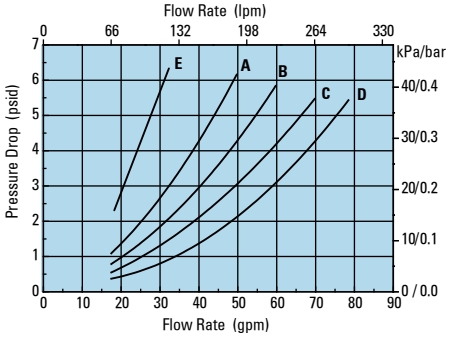
Service Element Part Numbers
A. P171573 (Synthetic)
B. P171574 (Synthetic)
C. P171575 (Cellulose)
D. P171576 (Cellulose)
E. P171572 (Wiremesh)
F. P569280 (Synthetic)

K070250/K071003 Assembly



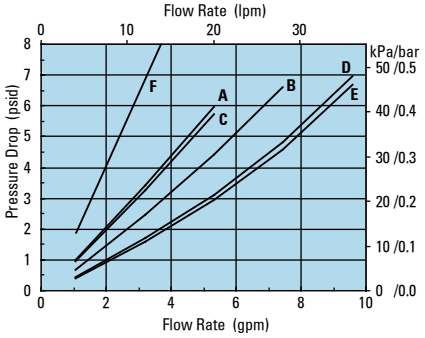
Service Element Part Numbers
A. P171579 (Synthetic)
B. P171580 (Synthetic)
C. P171581 (Cellulose)
D. P171582 (Cellulose)
E. P171583 (Wiremesh)
F P569281 (Synthetic)

K070248/K071001 Assembly



Service Element Part Numbers
A. P171555 (Synthetic)
B. P171556 (Synthetic)
C. P171557 (Cellulose)
D. P171558 (Cellulose)
E. P569279 (Synthetic)

K031027 Assembly



Service Element Part Numbers
A. P171501 (Synthetic)
B. P171502 (Synthetic)
C. P171503 (Cellulose)
D. P171504 (Cellulose)
E. P171505 (Wiremesh)
F. P569277 (Synthetic)

NOTE:
* subtract ½ psi
** add ½ psi

TI25 Tank Immersed Filters

Working Pressures to:	100 *psi* 690 kPa 6.9 bar
Flow Ranges to:	60 *gpm* 227 *lpm*

Features

TI25 tank immersed filter mounts to tank, with the head and inlet above the tank and the housing inside the tank. HF4 size elements replaceable through the filter cover. Features aluminum casting, Buna-N seals and steel bowls. For use with petroleum and water-based fluids. Electrical and visual service indicators and a variety of replacement filter media options are available.

Beta Rating
- Performance to $ß_{5(c)}$=1000

Porting Sizes
- 1¼" NPT

Replacement Filter Length
- 9" / 229 *mm*

Standard Bypass Ratings
- 25 *psi* / 150 kPa / 1.5 bar

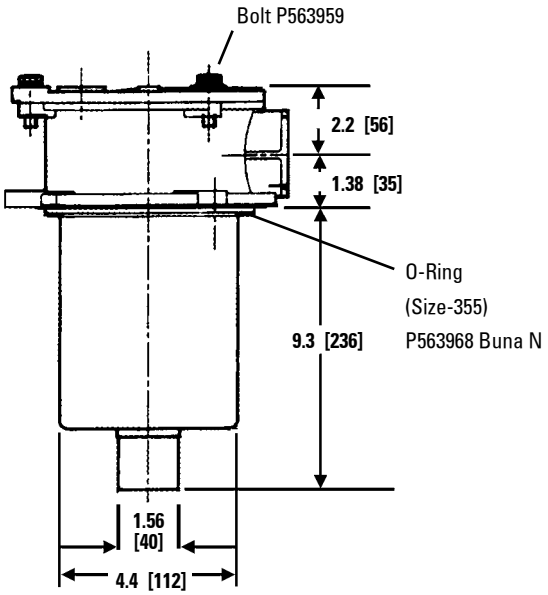
Operating Temperatures
- -22°F to 250°F / -30°C to 121°C

Assembly Weight
- 5.5 lbs / 2.5 kg

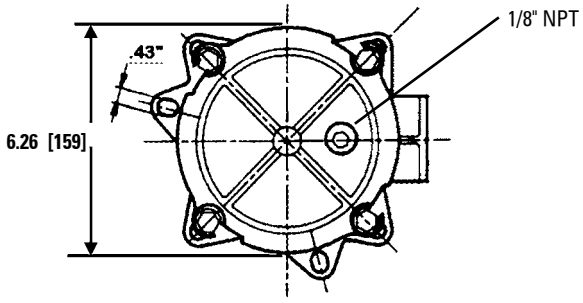
Element Collapse Pressure
- 150 *psid* / 1035 kPa / 10.3 bar

Donaldson

Assembly - Side View



Head - Top View



Mounting bolt circle: 6.25" [159 mm]
Tank cut-out: 5.00" [127 mm]
Mounting bolt holes: 5/16" [7.9 mm]

All dimensions above are shown in inches [millimeters]

TI25 Assemblies & Service Parts

TI25 Filter Assemblies

Port Size	Bypass Rating	Service Indicator	Bowl Length	Donaldson Part No.	Element	
1¼" NPT	25 psi / 172.5 kPa / 1.7 bar	Port Available	9.3" / 236 mm	K052051	Cellulose Media # 10	P167410
1¼" NPT	25 psi / 172.5 kPa / 1.7 bar	Visual	9.3" / 236 mm	K052046	Cellulose Media # 10	P167410
1¼" NPT	25 psi / 172.5 kPa / 1.7 bar	Visual	9.3" / 236 mm	K052047	Synteq Media # 2-1/2	P163903

Element Choices

Media Type	Beta$_{x(c)}$=200 Rating	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
Cellulose Media # 3		24	9.02/229	P167514	
Cellulose Media # 10		23	9.02/229	P167410	
Cellulose Media # 25	32		9.02/229	P167425	
Synteq Media # 1		6	9.02/229	P169341	Synthetic Media
Synteq Media # 1		6	9.02/229	P174622	Synthetic Media, Viton seals
Synteq Media # 2		9	9.02/229	P169344	Synthetic Media
Synteq Media # 2		9	9.02/229	P174623	Synthetic Media, Viton seals
Synteq Media # 2-1/2		10	9.02/229	P163903	Synthetic Media
Synteq Media # 4		20	9.02/229	P174624	Synthetic Media, Viton seals
Synteq Media # 9		23	9.02/229	P163910	Synthetic Media
Wiremesh Media # 74	75		9.02/229	P173781	Wire Mesh
Wiremesh Media # 149	150		9.02/229	P173780	Wire Mesh

Donaldson Triboguard™ Element Choices - Upgraded Performance

Media Number	Bx(c) = 1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
DT 5 µm	5 µm	9/231.8	DT-HF4-9-5UM	HF4 Series
DT 8 µm	8 µm	9/231.8	DT-HF4-9-8UM	HF4 Series
DT 14 µm	14 µm	9/231.8	DT-HF4-9-14UM	HF4 Series
DT 25 µm	25 µm	9/231.8	DT-HF4-9-25UM	HF4 Series

Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- Viton® seals are standard on all Donaldson Triboguard elements.

Optional Filter Service Indicators

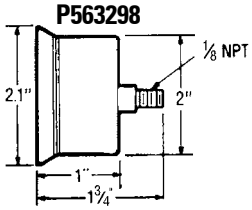
Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563297	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P563298	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded

Notes
* NOT PRESET: Setting adjustable for desired application

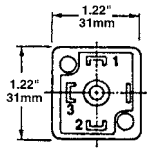
Optional Filter Service Parts

Donaldson Part No.	Description
P563959	Cover Bolt 5/16-18 x 1"
P563966	Cover Seal O-Ring -253
P563965	Bowl Seal O-Ring -245
P563968	Standard Reservoir Seal O-Ring -355
P563969	Thick Reservoir Seal
P563970	Bypass Cartridge 25 psi
P563960	Metal Bowl
P563958	Head Assembly

P563297
P563298

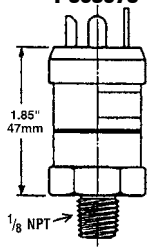


Instructions
1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/ counter-clockwise to decrease set point
4. NO / NC



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

P563978

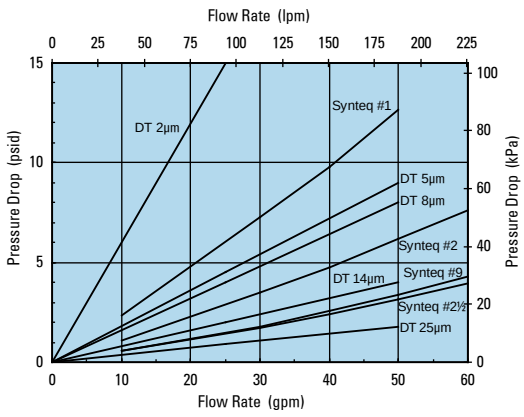


Adjustment screw located in center of elec. prongs

Performance Data

For a full explanation of how our performance curves were derived, see page 228.

TI25 Elements



FIK04 Suction/Return Combination Filter

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 element, which is capable of delivering filtered and pressurized oil, even in bypass situations. Emergency suction flow is also filtered. The Combo 300 series operates in a standard flow (outside to inside) configuration. SAE O-Ring ports are standard to meet popular application requirements.

- Combo 300 Series: 4-point mounting
- Head material: aluminum
- Housing material: steel
- Cover Material: glass-filled Nylon
- Buna N seals standard
- Main elements include integrated bypass filters

Beta Rating (per ISO 16889)
- Performance to $ß_{11\ (c)}$=1000

Porting Sizes
- 300: inlet: SAE-20 + SAE-16; outlet: (2) SAE-16

Housing Weight
- 300: 10.8 lbs / 4.9 kg

Replacement Filter Lengths
- 300: 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

Element Collapse Pressure
- 145 *psid* / 1000 kPa / 10 bar

Return Flow Rate
- 300: 79 gpm (300 lpm)

Emergency Suction Flow Rate
- 300: 27 gpm (100 lpm)

Donaldson

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

Element Choices

Media Type	$ß_{x(c)} = 1000$	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 β=1000 elements 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 elements are standard flow (outside to inside).
- Buna N seals are standard on all FIK04 elements.

Suction Element Choices

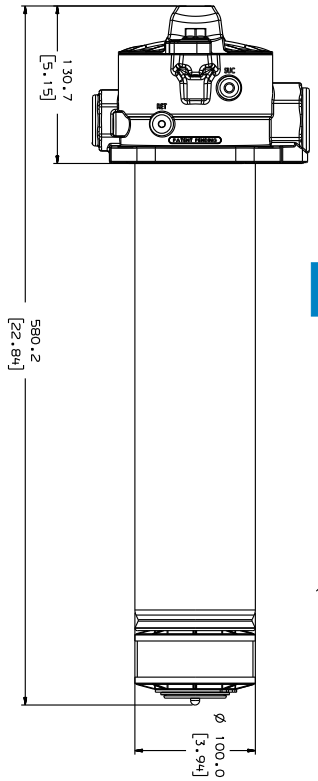
Media Type	ßx(c) = 1000	Length (in./mm)	Part Number	Comments
Wire Mesh	125 µm wire mesh	50.2 mm	P764183	For Combo 300 Assemblies

Indicator Options

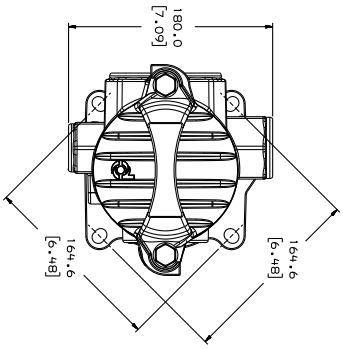
Part Number	Set Point	Style	Connection	Comments
P764467	36 psi (2.5 bar)	30 VDC, N.O.	G1/8"	for FIK Combo 300
P764613	36 psi (2.5 bar)	30 VDC, N.C.	G1/8"	for FIK Combo 300
P764612	36 psi (2.5 bar)	Visual	G1/8"	for FIK Combo 300

Combo 300 Series

Assembly - Side View



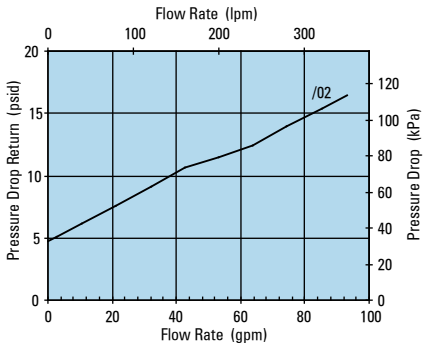
Head - Top View



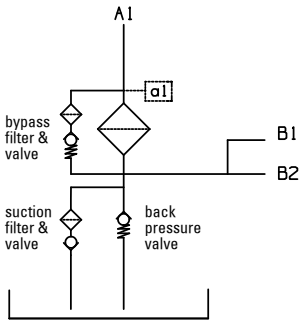
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

FIK Suction / Return Combo Assembly



Flow Schematic



HDK06 In-Line/Tank Mount Filter

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*

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. Element flow is inside to outside. BunaN seals are standard.

HDK06 assemblies come complete with our ß14(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.

Synteq®

See what's so special about Donaldson-developed Synteq® synthetic filter media on page 240.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Porting Sizes
- 2½" NPT

Assembly Weight
- 26 lbs / 12 kg

Replacement Filter Length
- 16" / 406*mm*

Standard Bypass Rating
- 25 *psi* / 172.5 kPa / 1.7 bar

Operating Temperatures
- Synthetic media -20°F to 250°F
  -29°C to 121°C

Element Burst Ratings
- 100 *psid* / 690 kPa / 6.9 bar

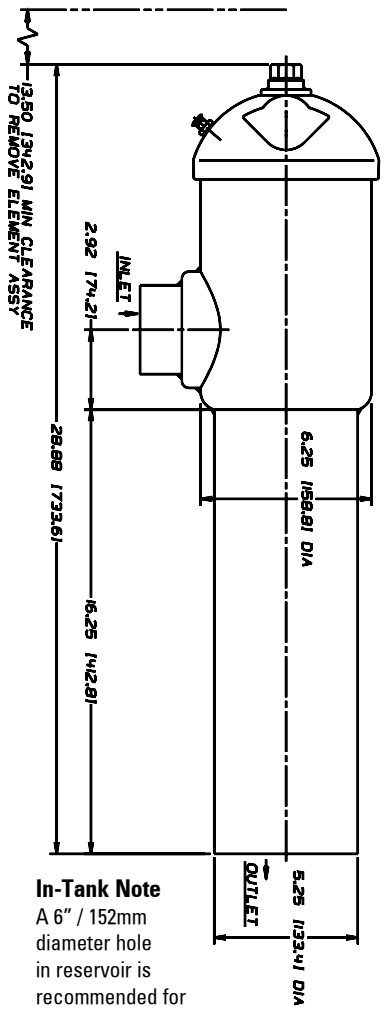
Donaldson

Assembly - Side View

Applications

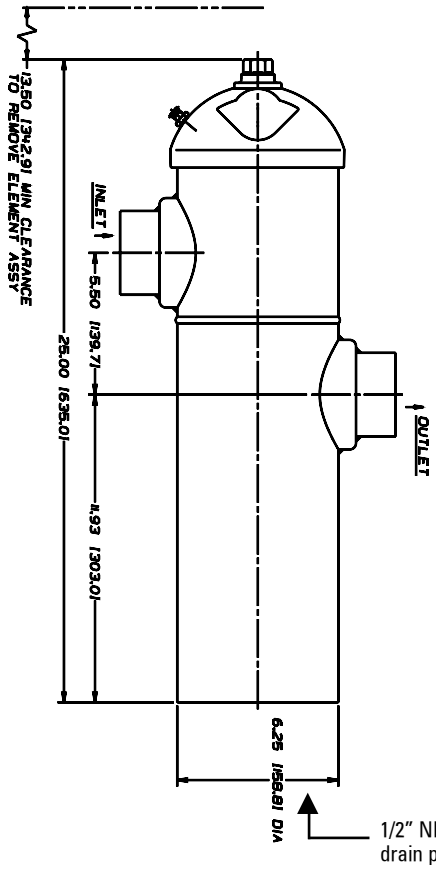
Cooling Circuits
Return-Line/Suction
Lube Oil Systems
Fluid Conditioning

In-Tank Model



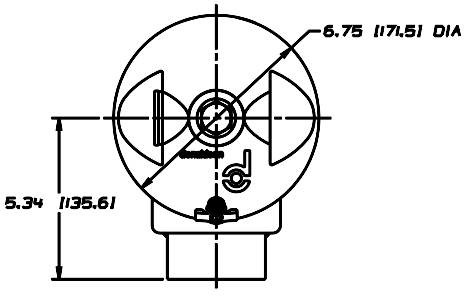
In-Tank Note
A 6" / 152mm diameter hole in reservoir is recommended for in-tank installation.

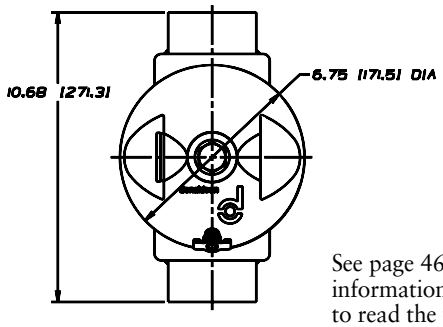
In-Line Model



1/2" NPT drain plug hole

Head - Top View





See page 46 for information on how to read the visual service indicator.

All dimensions above are shown in inches [millimeters]

HDK06 Components

In-Stock Assemblies

Style	Part No.	Port Size	Bypass Rating	Indicator	Includes Filter Cartridge
In-Tank	K060173	2½" NPT	25 psi / 172.5 kPa	Visual	P164697 Synteq®
In-Line	K060160				

Replacement Filter Cartridges

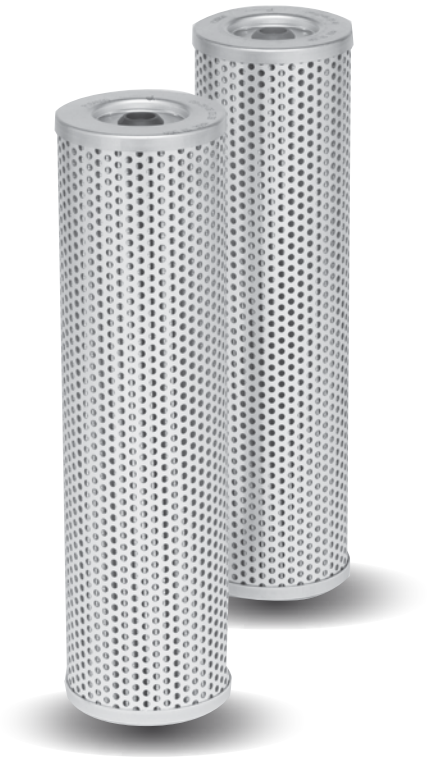
Media Number	Media Technology	$B_{x(c)}$ = 1000 Rating	Part No.
No. ½	Synteq®	<4 µm	P161016
No. 2	Synteq	9 µm	P165628
No. 2½	Synteq	10 µm	P176221
No. 3	Synteq	14 µm	P164697
No. 9	Synteq	23 µm	P164699
No. 16	Synteq	22 µm	P161571
No. 20	Synteq	>50 µm	P166597

Media Number	Media Technology		Part No.
No. 149	Wiremesh	150 µm nominal	P160700

Element Notes

- Standard HDK06 replacement filters have BunaN seals, which are appropriate for most applications involving petroleum oil. Filters with seals made of fluorocarbon elastomer (such as Viton® from DuPont Dow Elastomers and Fluorel from 3M Company) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F.
- HDK06 elements 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.

All HDK06 filter cartridges are 16"/406mm in length.

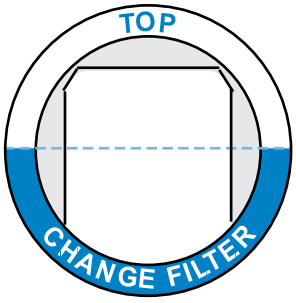


How to Read the Donaldson Visual Indicator

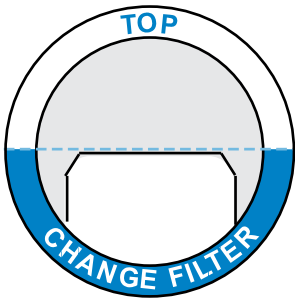
This simple device will tell you when the filter needs to be changed. Always check when the fluid is at operating temperature and the system is at normal operating flow.

If the top of the white panel is below the lower half of the window, the filter needs servicing.

Visual Indicators are found on these Donaldson filter assembly models: HAK05, HDK06, HFK08 & HEK11.



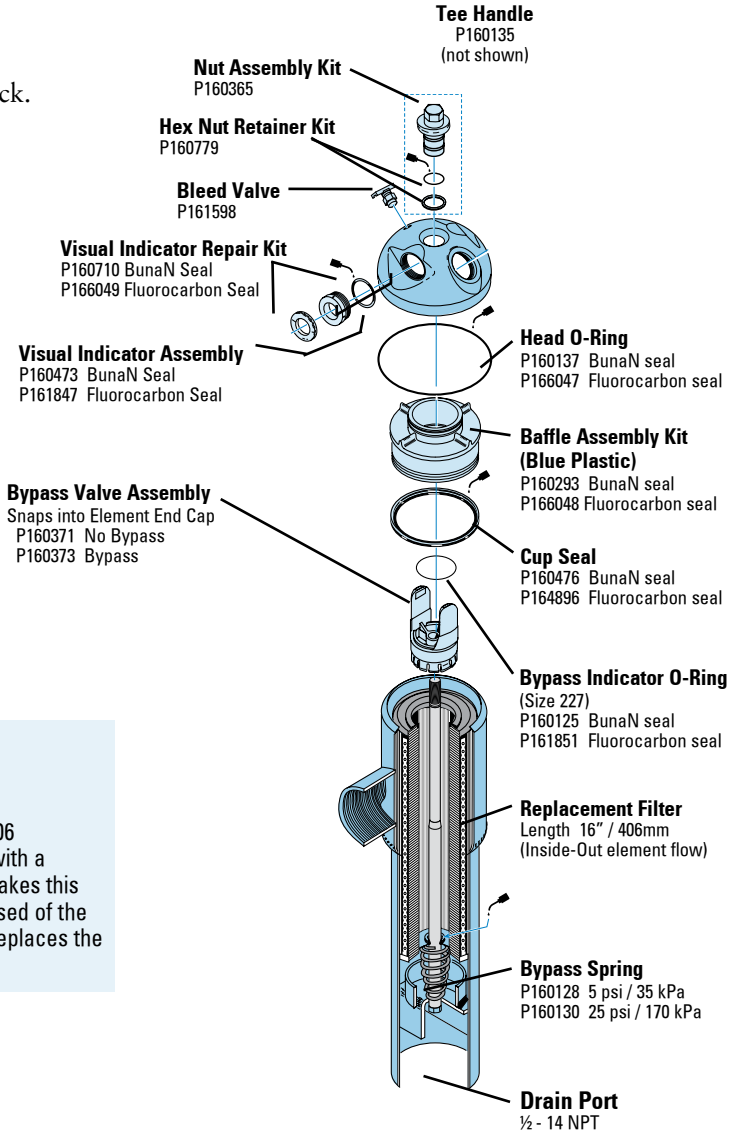
Filter OK



Filter Needs Service

HDK06 Service Parts

Not all service parts are in-stock.
Call for availability.



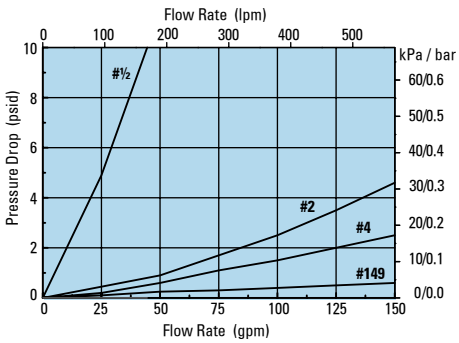
Optional Tee Handle
for Easier Servicing

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.

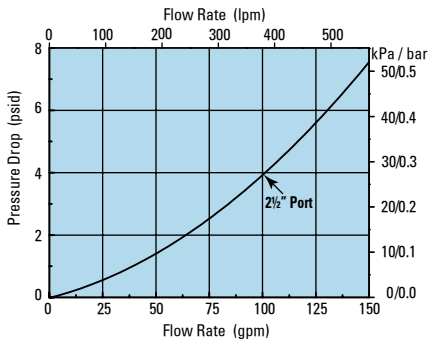
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

HDK06 Element Only



HDK06 Head Only



HFK08 In-Line/Tank Mount Filter

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 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 fluoroelastomer seals. A visual service indicator is built into the HFK08 head; see the service parts list on page 51.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Porting Size
- 3" NPT or SAE-20 O-Ring

Assembly Weight
- 34 lbs / 15.4 kg

Replacement Filter Length
- 18" / 457*mm*

Standard Bypass Ratings
- 25 *psi* / 172.5 kPa / 1.7 bar

Operating Temperatures
- Synthetic media -20°F to 250°F
-29°C to 121°C

Element Burst Ratings
- 75 *psi* / 517 kPa / 5.2 bar (synthetic)
- 100 *psi* / 689 kPa / 6.9 bar (wiremesh)

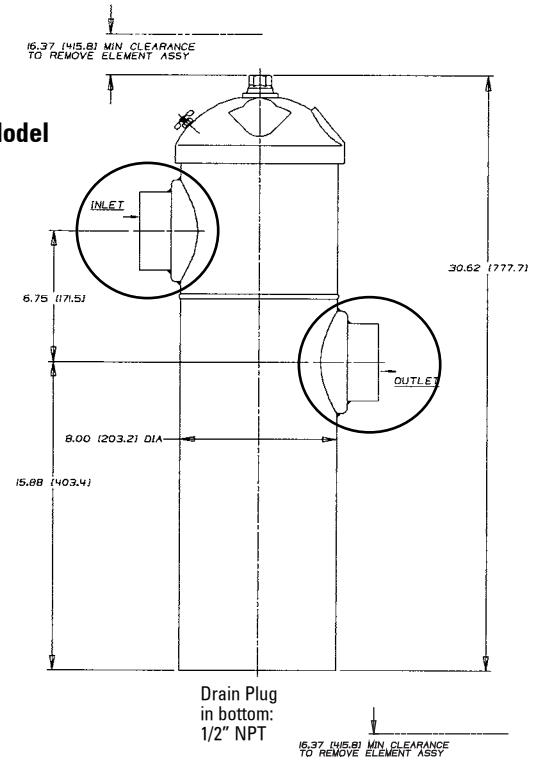
Donaldson

Applications:

Return Lines
Lube Oil Systems
Kidney Loop Systems
Fluid Conditioning
Suction Lines

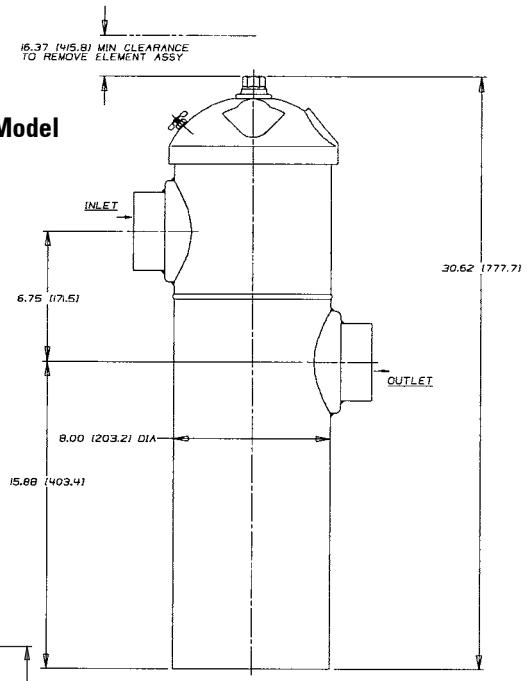
Assembly - Side View

In-Line Model



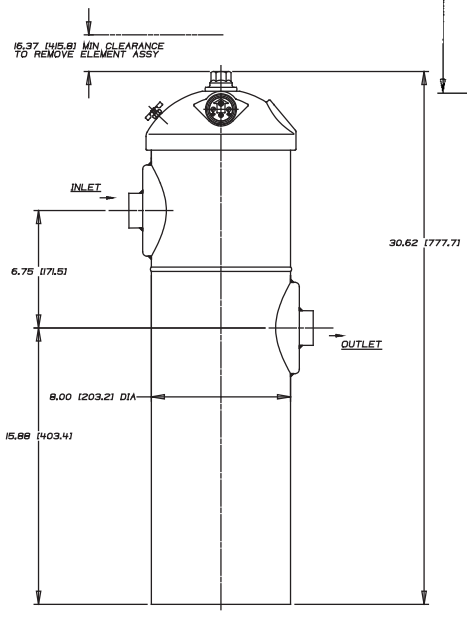
Drain Plug in bottom: 1/2" NPT

In-Tank Model

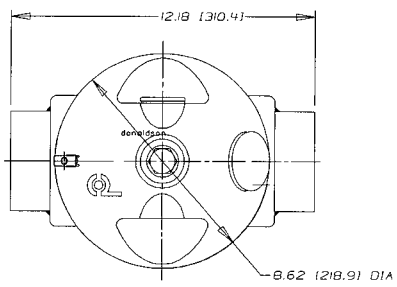


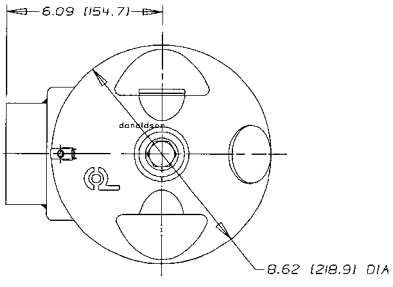
HFK08-0087 In-Line Model

Smaller port size (SAE-20) works well for Kidney Loop filtration.



Head - Top View





All dimensions above are shown in inches [millimeters]

HFK08 Components

In-Stock HFK08 Assemblies

Port Size	Bypass Rating	Indicator Style[1] & Location	Assembly Part No.	Media	Length (in./mm)	Filter Part No.
3" NPT	25 psi / 172.5 kPa	Visual, Left side Visual, Right side	K080051, In-Tank	No. 9	18"/457mm	P164703
			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

1 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.

Replacement Filter Choices

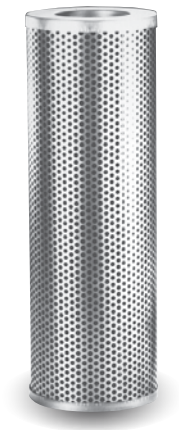
Media Number	Media Technology	$B_{x(c)}$ = 1000 Rating	Part No.
No. ½	Synteq®	<4 µm	P164405
No. 2	Synteq	9 µm	P166462
No. 2½	Synteq	10 µm	P176222
No. 3	Synteq	14 µm	P164701
No. 6	Synteq	13 µm	P164407 w/Viton seal
No. 9	Synteq	23 µm	P164703
Media Number	**Media Technology**		**Part No.**
No. 44	Wiremesh	45 µm nominal	P173573
No. 149	Wiremesh	150 µm nominal	P163945

Filter Notes

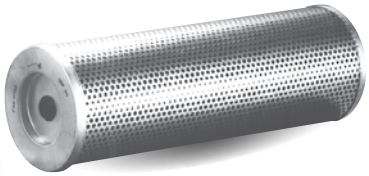
- HFK08 replacement filters have seals made of BunaN, except as noted above, which is a material appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F. (Viton® is a registered trademark of DuPont Chemical Corp.)
- 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.



Synteq®

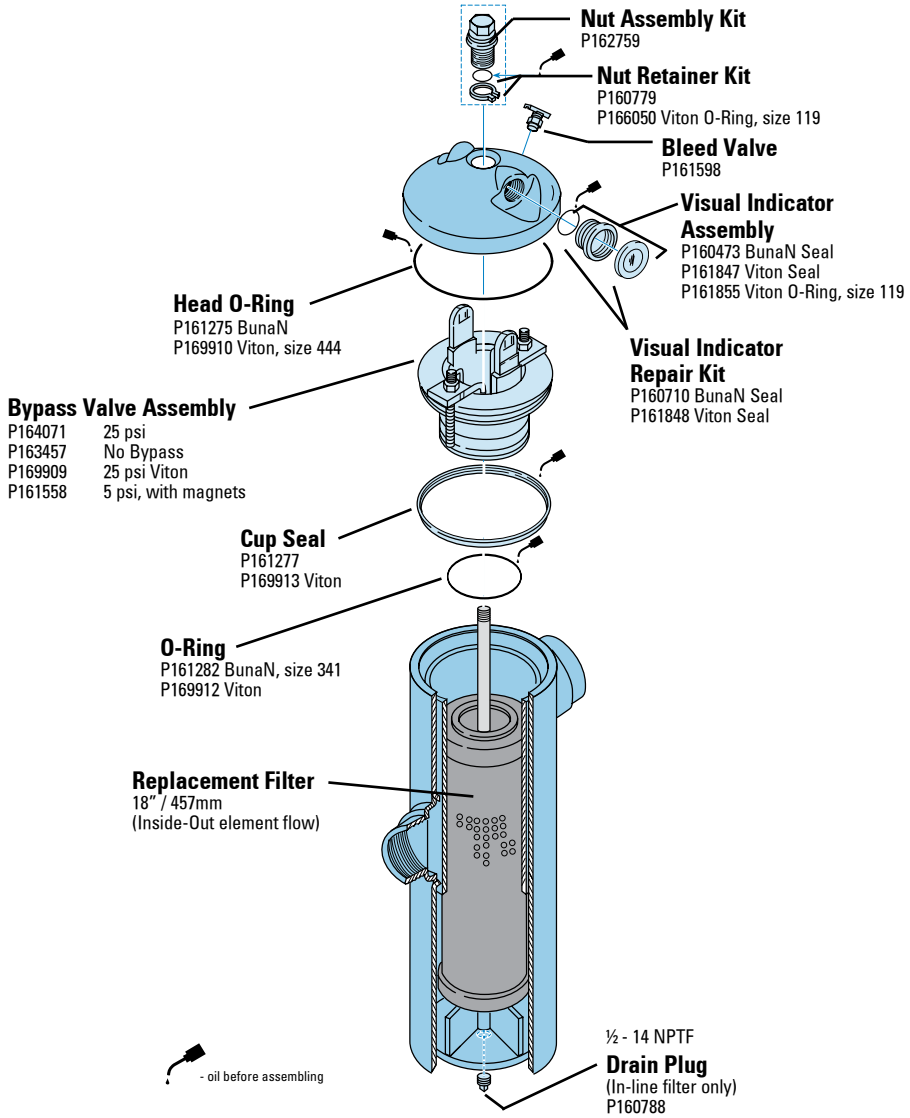
Learn more about Donaldson-developed Synteq® synthetic filter media on page 240.

Donaldson

HFK08 Service Parts

Not all service parts are in-stock.
Call for availability.

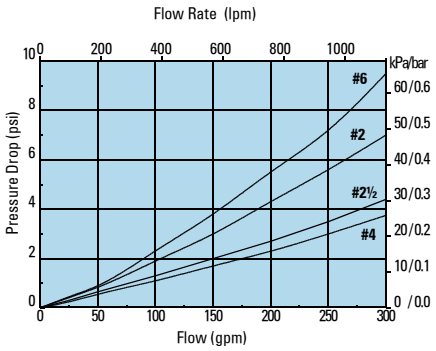
See page 46 for information on how to read the visual service indicator.



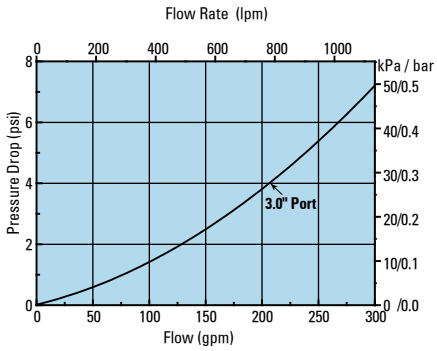
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

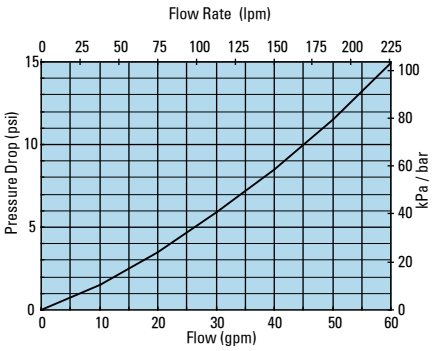
HFK08 Element Only



HFK08 Housing Only



HFK08-0087 Assembly



HRK10

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 element servicing for ease of maintenance, and a selection of service indicators. The HRK10 all-steel housing design provides a strong, durable, and dependable unit. We offer standard features like deep pleat elements for higher dirt holding capacity and our standard Donaldson Triboguard™ 4-layer media element 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) elements 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 ß_{4 (c)}=1000

Porting Sizes
- Standard 4" ANSI Flange

Housing Weight
- 140 lbs / 64 kg

Replacement Filter Lengths
- 22" / 559 mm

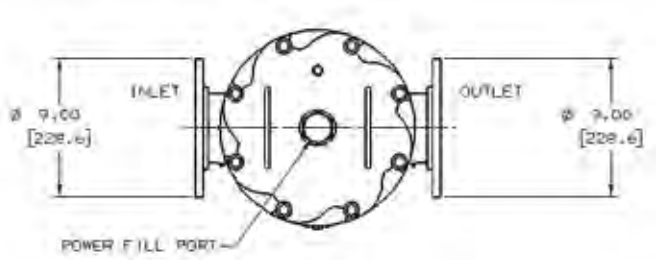
Standard Bypass Rating
- No Bypass
- 5 *psi* / 34.5 kPa / 0.34 bar
- 25 *psi* / 172 kPa / 1.7 bar
- 50 *psi* / 345 kPa / 3.4 bar

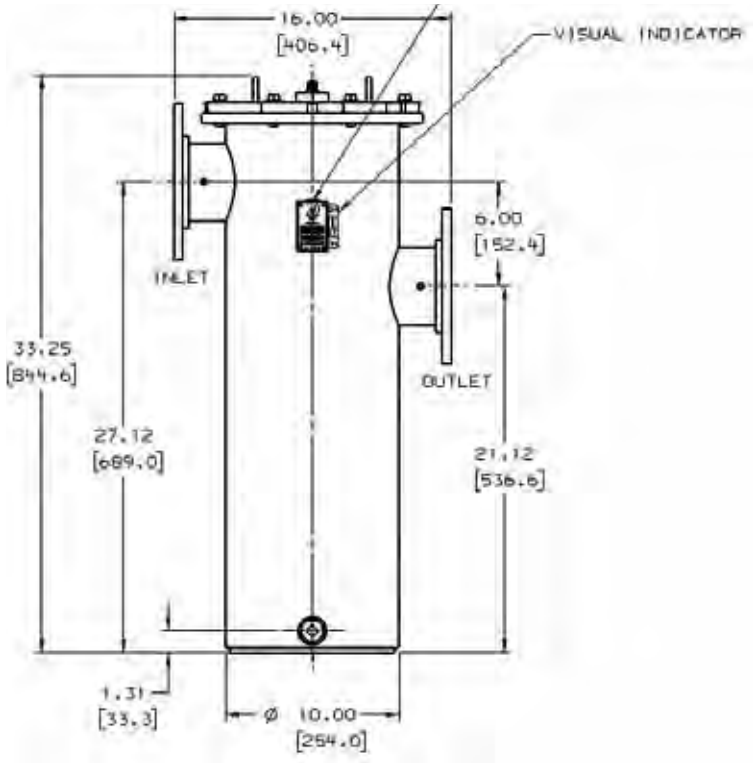
Operating Temperatures
- -20°F to 250°F (-29° to 121°C)

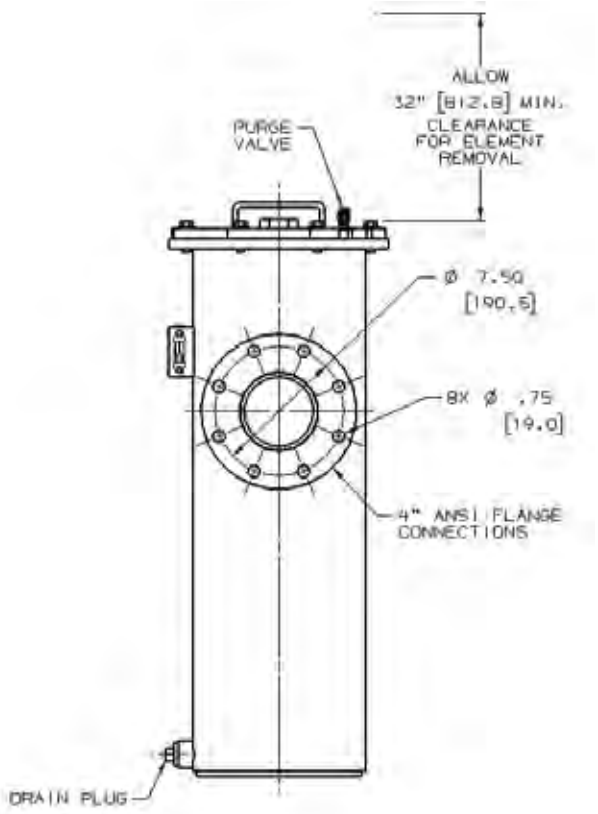
Element Collapse Pressure
- 100 *psid* / 689 kPa / 6.9 bar

Donaldson

HRK10 Assembly Drawings







• All dimensions above are shown in inches [millimeters]

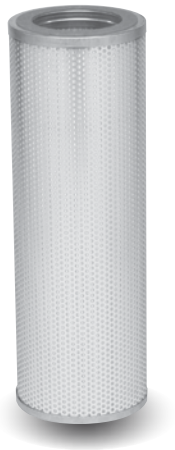
HRK10 Filter Housing

Part No.	Port Connections	Bypass Valve	Indicator Options
HRK100001	4" ANSI Flange	No bypass	Visual standard, electrical optional
HRK100002	4" ANSI Flange	5 psi (0.34 bar) bypass	Visual standard, electrical optional
HRK100003	4" ANSI Flange	25 psi (1.7 bar) bypass	Visual standard, electrical optional
HRK100004	4" ANSI Flange	50 psi (3.4 bar) bypass	Visual standard, electrical optional

Housing shipped without element.

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



Donaldson Triboguard Element Choices - Upgrade Performance

Media Number	$B_{X(c)} = 1000$	Length (in./mm)	Triboguard Part Number	Comments	Replaces old HEK11 Elements
2 µm	<4 µm	22/559	P566187	HRK10 Series	P163472
5 µm	5 µm	22/559	P566188	HRK10 Series	none
8 µm	8 µm	22/559	P566189	HRK10 Series	P176417* or P176223**
14 µm	14 µm	22/559	P566190	HRK10 Series	P165449
25 µm	25 µm	22/559	P566191	HRK10 Series	P164707
150 µm	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 elements in existing HEK11 housings.
* 9 µm rating
** 10 µm rating

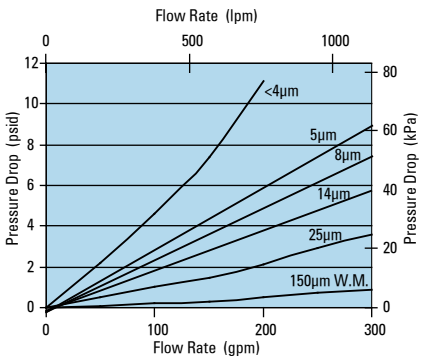
Filter Notes:

- All ß=1000 elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- All HRK10 elements are reserve flow (inside to outside), keeping contaminants contained during servicing.
- Viton® seals are standard on all HRK10 elements.

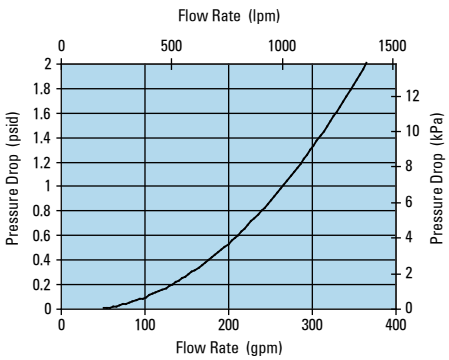
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

HRK10 Element Only
(22"/559mm)



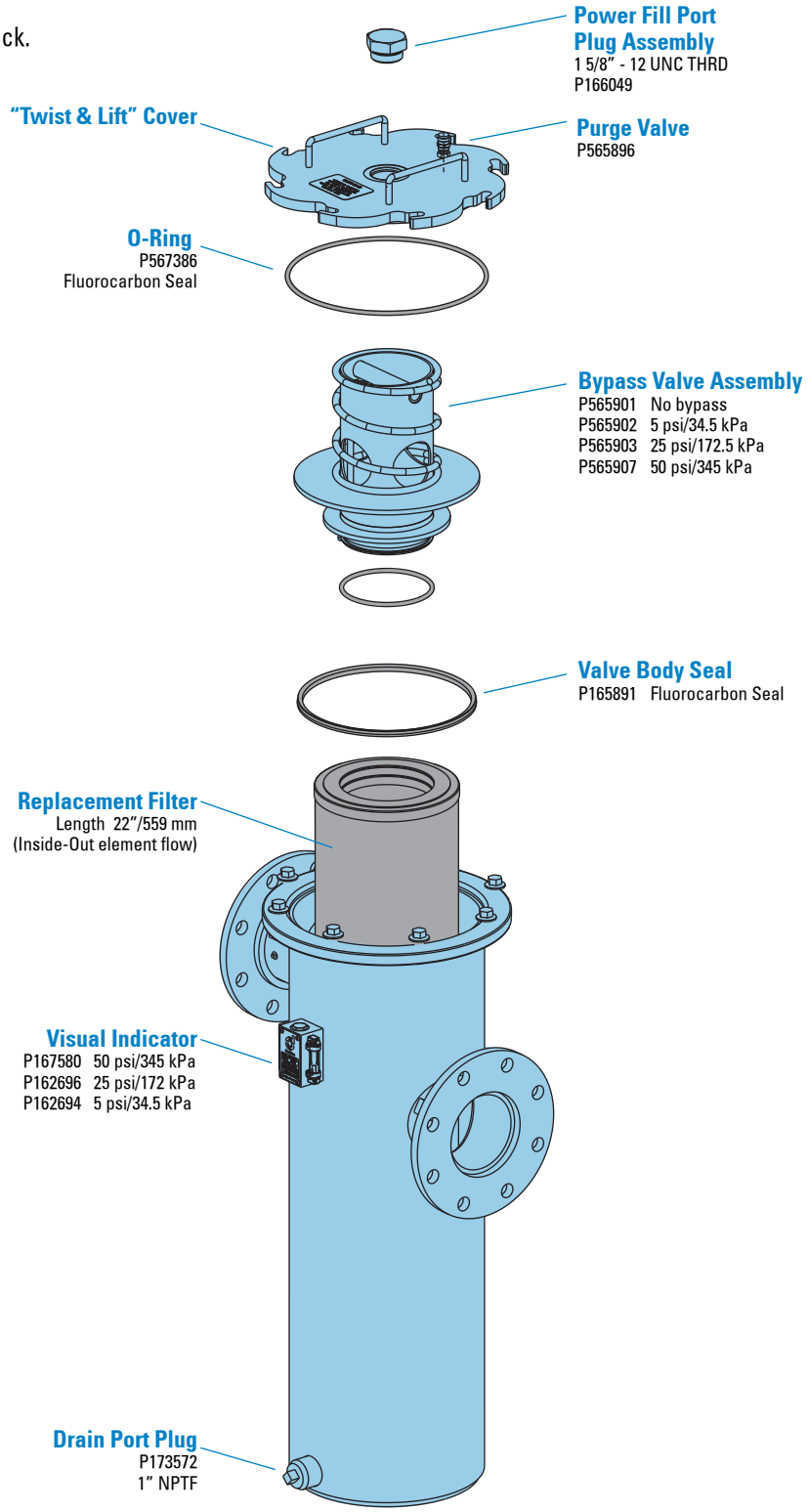
HRK10 Housing Only
(with 4" Port)



Donaldson

HRK10 Service Parts

Not all service parts are in-stock.
Call for availability.



W041

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 element 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 elements for higher dirt holding capacity and our standard Donaldson Triboguard™ 4-layer media element 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 element 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 $ß_{4\,(c)}$=1000

L-Type Porting Sizes
- SAE 24 O-Ring
- 2" SAE 4 bolt Code 61
- 2½" SAE 4 bolt 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

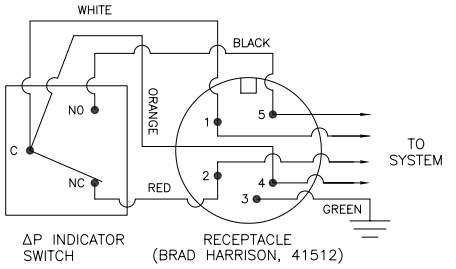
Operating Temperatures
- -20°F to 250°F / -29° to 121°C

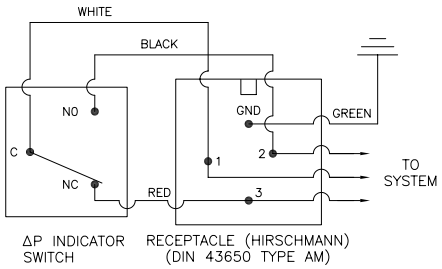
Element Collapse Pressure
- 150 *psid* / 1034 kPa / 10.3 bar (standard)

Indicator Switch Schematic Wiring Diagram

Indicator Switch Schematic Wiring Diagram

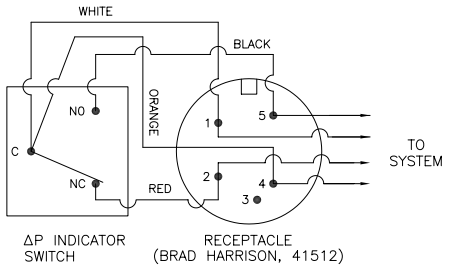
Aluminum Electrical Housings

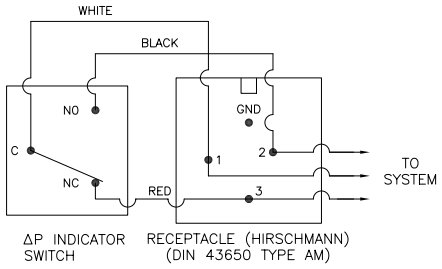




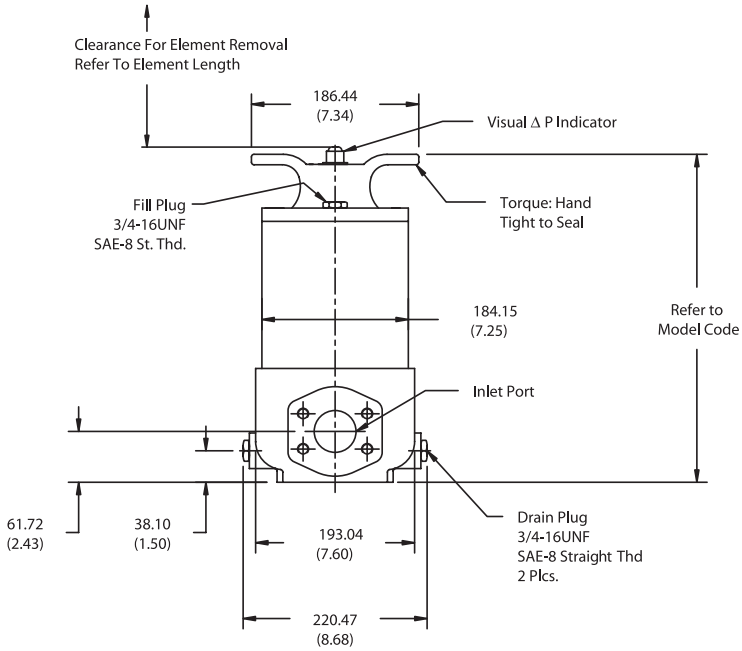
Note: The female plug (connector) is to be furnished by customer.

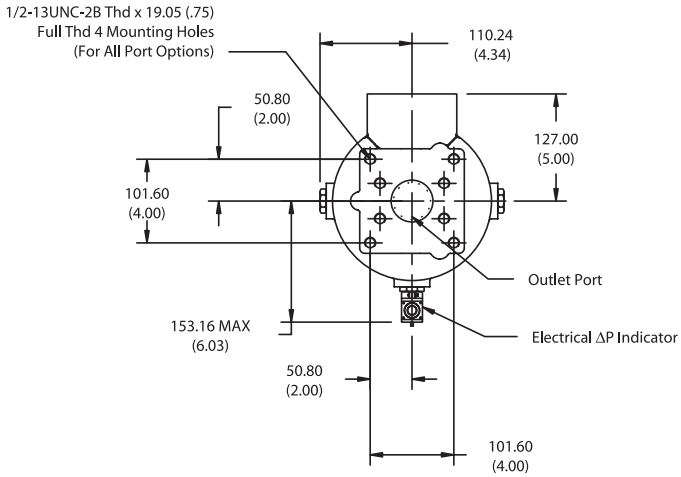
Plastic Electrical Housings





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





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.

Donaldson Triboguard Element Choices - Upgrade Performance

Media Number	$B_{x(c)} = 1000$	Length (in./mm)	Donaldson Triboguard Part Number	Comments
2 µm	<4 µm	16/425.3	DT-8300-16-2UM	8300 Series
5 µm	5 µm	16/425.3	DT-8300-16-5UM	8300 Series
8 µm	8 µm	16/425.3	DT-8300-16-8UM	8300 Series
14 µm	14 µm	16/425.3	DT-8300-16-14UM	8300 Series
25 µm	25 µm	16/425.3	DT-8300-16-25UM	8300 Series
2µm	<4 µm	39/980.9	DT-8300-39-2UM	8300 Series
5 µm	5 µm	39/980.9	DT-8300-39-5UM	8300 Series
8 µm	8 µm	39/980.9	DT-8300-39-8UM	8300 Series
14 µm	14 µm	39/980.9	DT-8300-39-14UM	8300 Series
25 µm	25 µm	39/980.9	DT-8300-39-25UM	8300 Series
2 µm	<4 µm	16/408.8	DT-8310-16-2UM	8310 Series: Extended Life
5 µm	5 µm	16/408.8	DT-8310-16-5UM	8310 Series: Extended Life
8 µm	8 µm	16/408.8	DT-8310-16-8UM	8310 Series: Extended Life
14 µm	14 µm	16/408.8	DT-8310-16-14UM	8310 Series: Extended Life
25 µm	25 µm	16/408.8	DT-8310-16-25UM	8310 Series: Extended Life
2 µm	<4 µm	39/963.6	DT-8310-39-2UM	8310 Series: Extended Life
5 µm	5 µm	39/963.6	DT-8310-39-5UM	8310 Series: Extended Life
8 µm	8 µm	39/963.6	DT-8310-39-8UM	8310 Series: Extended Life
14 µm	14 µm	39/963.6	DT-8310-39-14UM	8310 Series: Extended Life
25 µm	25 µm	39/963.6	DT-8310-39-25UM	8310 Series: Extended Life
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

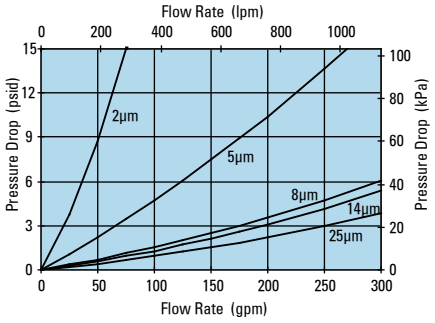
Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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 Triboguard elements.

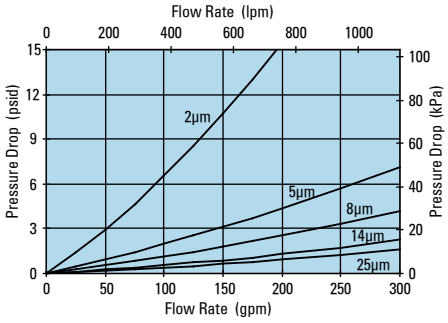
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

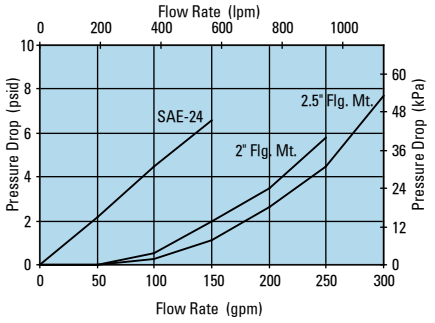
DT-8300-16 Element Only



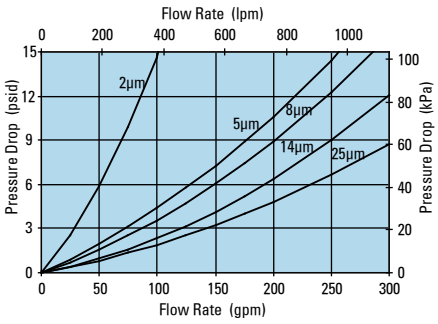
DT-8300-39 Element Only



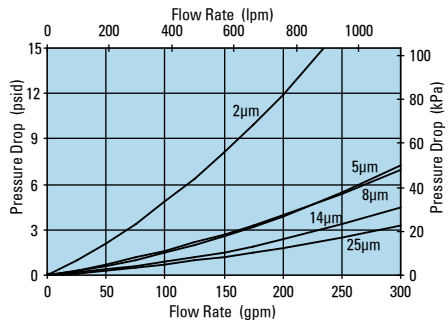
W041 Housing Only



DT-8310-16 Element Only



DT-8310-39 Element Only



Donaldson

Ordering Guide

Filter Assembly	W041	1	D	4	L | N	B	5
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6	TABLE 7
Service Element	Elements ordered separately. See page 58 for element choices.						

Table 1

Filter Assembly / Service Element	
CODE	DESCRIPTION
W041	Assembly (L porting)

Table 2

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

Table 3

Port Size Options	
CODE	PORT SIZE
D	1-7/8" - 12 UN (SAE 24)
J	2" SAE 4 Bolt Flange Code 61
K	2-1/2" SAE 4 Bolt Flange Code 61

Table 4

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
3	25 psid
4	50 psid
6	90 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	DP 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
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
E	E.P.R.
V	Viton

Table 7

Assembly & Element Length	
CODE (LENGTH)	ELEMENT 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

W042

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 elements, 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 elements for higher dirt holding capacity and our standard Donaldson Triboguard™ 4-layer media element 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 element replacement
- Large T-handles for fast servicing without tools
- Wide range of indicator options
- Two element 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 $ß_{<4\ (c)}=1000$

Porting Sizes
- 3" SAE 4 bolt 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)

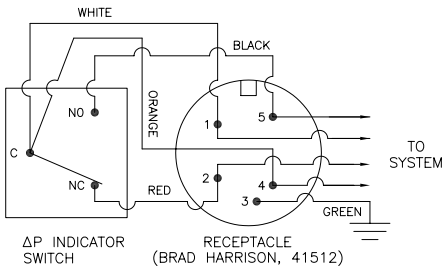
Element Collapse Pressure
- 150 *psid* / 1034 kPa / 10.3 bar (standard)

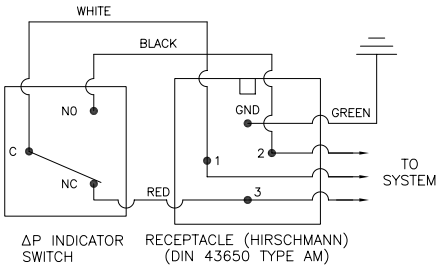
Donaldson

Indicator Switch Schematic Wiring Diagram

Indicator Switch Schematic Wiring Diagram

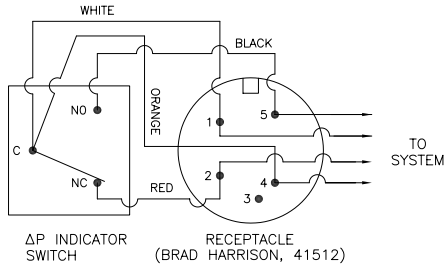
Aluminum Electrical Housings

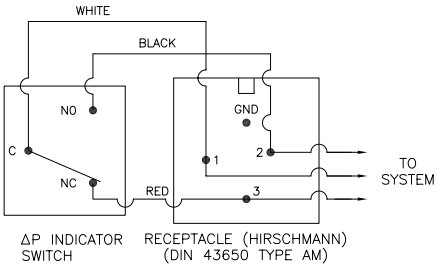




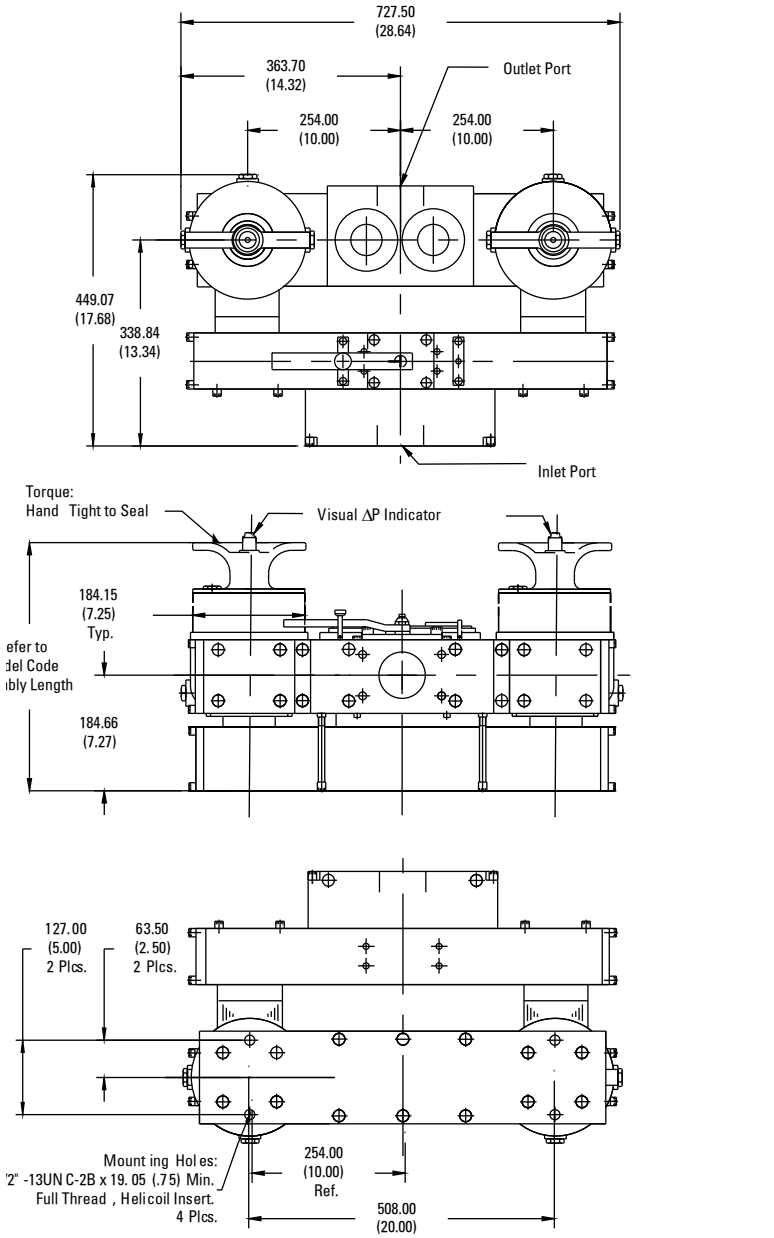
Note: The female plug (connector) is to be furnished by customer.

Plastic Electrical Housings





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



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.

Donaldson Triboguard Element Choices - Upgrade Performance

Media Number	$B_{x(c)} = 1000$	Length (in./mm)	Donaldson Triboguard Part Number	Comments
2 µm	<4 µm	16/425.3	DT-8300-16-2UM	8300 Series
5 µm	5 µm	16/425.3	DT-8300-16-5UM	8300 Series
8 µm	8 µm	16/425.3	DT-8300-16-8UM	8300 Series
14 µm	14 µm	16/425.3	DT-8300-16-14UM	8300 Series
25 µm	25 µm	16/425.3	DT-8300-16-25UM	8300 Series
2µm	<4 µm	39/980.9	DT-8300-39-2UM	8300 Series
5 µm	5 µm	39/980.9	DT-8300-39-5UM	8300 Series
8 µm	8 µm	39/980.9	DT-8300-39-8UM	8300 Series
14 µm	14 µm	39/980.9	DT-8300-39-14UM	8300 Series
25 µm	25 µm	39/980.9	DT-8300-39-25UM	8300 Series
2 µm	<4 µm	16/408.8	DT-8310-16-2UM	8310 Series: Extended Life
5 µm	5 µm	16/408.8	DT-8310-16-5UM	8310 Series: Extended Life
8 µm	8 µm	16/408.8	DT-8310-16-8UM	8310 Series: Extended Life
14 µm	14 µm	16/408.8	DT-8310-16-14UM	8310 Series: Extended Life
25 µm	25 µm	16/408.8	DT-8310-16-25UM	8310 Series: Extended Life
2 µm	<4 µm	39/963.6	DT-8310-39-2UM	8310 Series: Extended Life
5 µm	5 µm	39/963.6	DT-8310-39-5UM	8310 Series: Extended Life
8 µm	8 µm	39/963.6	DT-8310-39-8UM	8310 Series: Extended Life
14 µm	14 µm	39/963.6	DT-8310-39-14UM	8310 Series: Extended Life
25 µm	25 µm	39/963.6	DT-8310-39-25UM	8310 Series: Extended Life
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

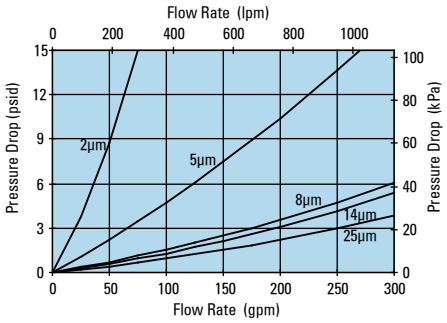
Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- Extended life designs are also potted into machined aluminum end caps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

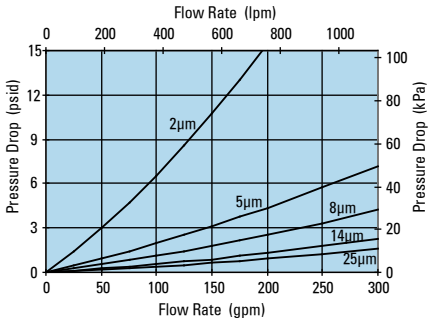
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

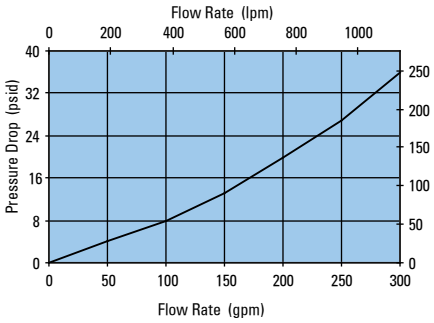
DT-8300-16 Single Element Only



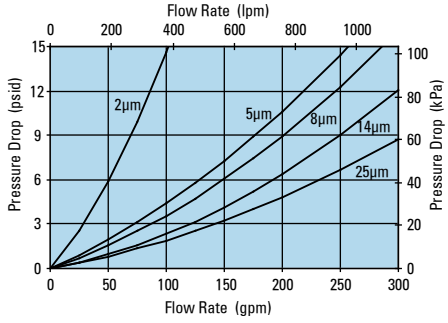
DT-8300-39 Single Element Only



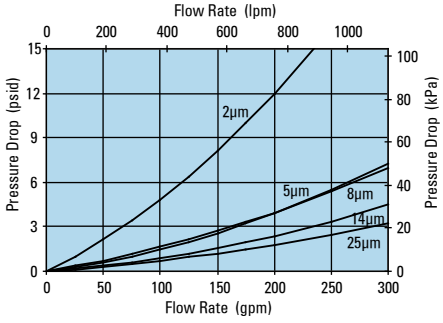
W042 Housing Only



DT-8310-16 Single Element Only



DT-8310-39 Single Element Only



Donaldson

Ordering Guide

Filter Assembly	W042	1	L	4	L | N	B	5
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6	TABLE 7
Service Element	Elements ordered separately. See page 62 for element choices.						

Table 1

Filter Assembly / Service Element	
CODE	DESCRIPTION
W042	Assembly

Table 2

Element 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	DP 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	DP 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
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 DP indicator

Table 6

Seal Options	
CODE	MATERIAL
B	Buna N
E	E.P.R.
V	Viton

Table 7

Assembly & Element Length	
CODE (LENGTH)	ELEMENT 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

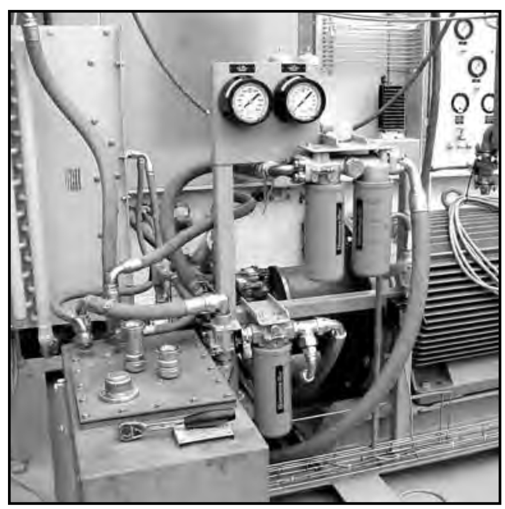
Donaldson.

DURAMAX® Filters:
Where and Why Used

Donaldson DURAMAX®, well-known as the highest pressure spin-on filters available, are most often used in return-line positions and bulk oil applications. As spin-ons, they are particularly well-suited for duplex circuits. DURAMAX working pressures range from 350 *psi* up to 1000 *psi (24 to 69 bar);* static pressures from 800 *psi* up to 2000 *psi (55 to 138 bar)*.

Mounted in Parallel

DURAMAX units at this ore mine filter the bulk oil as it runs from the storage tanks into the delivery trucks for transport to the customer. The filters were mounted in parallel, with the objective of obtaining a higher flow rate.



Gas Turbine Installation

Donaldson DURAMAX units filter the hydraulic controls circuit on this gas turbine installation in Hungary.

Donaldson.

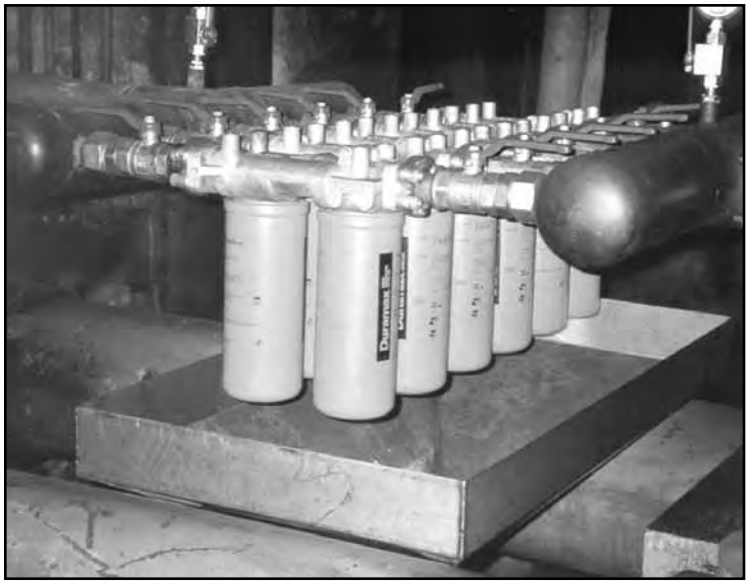
Hydraulic Series	Flow Range	Pressure (NFPA/t3.10.17) Working	Static	Porting Types	Media Choices
HMK03	0-25 gpm 0-95 lpm	1000 psi 6895 kPa 69 bar	2000 psi 13790 kPa 137.9 bar	SAE-12 O-Ring	Synteq® Synthetic Media
HMK04 HNK04	0-35 gpm 0-130 lpm	500 psi 3448 kPa 34.5 bar	1000 psi 6895 kPa 69 bar	SAE-12, -16 O-Ring ¾, 1" NPT	Synteq Synthetic Media, Cellulose, or Water Removal
HMK05 HNK05	0-50 gpm 189 lpm	350 psi 2413 kPa 24 bar	800 psi 5516 kPa 55 bar	SAE-20 O-Ring 1¼" NPT	Synteq Synthetic Media, Wiremesh, or Water Removal
HMK24 (dual head, two elements)	0-60 gpm 0-230 lpm	500 psi 3450 kPa 34.5 bar	1000 psi 6895 kPa 69 bar	1¼" SAE O-Ring 1¾" SAE 4-Bolt Flange	Synteq Synthetic Media, or Water Removal
HMK25 (dual head, two elements	0-100 gpm 0-378 lpm	350 psi 2413 kPa 24 bar	800 psi 5516 kPa 55 bar	1½" SAE 4-Bolt Flange SAE-24 O-Ring 1½" NPT	Synteq Synthetic Media, Wiremesh, or Water Removal
W061	0-100 gpm 0-379 lpm	600 psi 4137 kPa 41 bar	1500 psi 10342 kPa 103 bar	SAE-12, -16 O-Ring	Synteq Synthetic Media

Case Study: Bearing Lube Circuit Upgrade in a Steel Mill

Before Upgrade

- Messy, convoluted.
- Filter changeout was difficult & complicated.
- Didn't maintain necessary cleanliness level.

After Upgrade



- Duplex arrangement — change filters without shutting down system.
- East to service spin-on filters.
- Donaldson guaranteed cleanliness level of ISO 16/11 for 20 years. Actual consistent level so far is ISO 13/10.
- Most cost effective solution, beating all competitors in customer tests.

Donaldson

HMK03 DURAMAX® Spin-On Filter

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*

Synteq®

Features

HMK03 Series Duramax® spin-on filters offer twice the capacity of competitive filters, yet they are physically smaller than traditional housing/cartridge filter assembles. 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 'n 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. Likewise, select the exact indicator types and bypass options to suit your application.

Beta Rating
- Performance to $ß_{6(c)}$=1000

Porting Sizes
- ¾" SAE O-Ring (standard)

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

Replacement Filter Lengths
- 5.5" / 140*mm*
- 9.5" / 242*mm*

Standard Bypass Ratings
- 50 *psi* or No Bypass

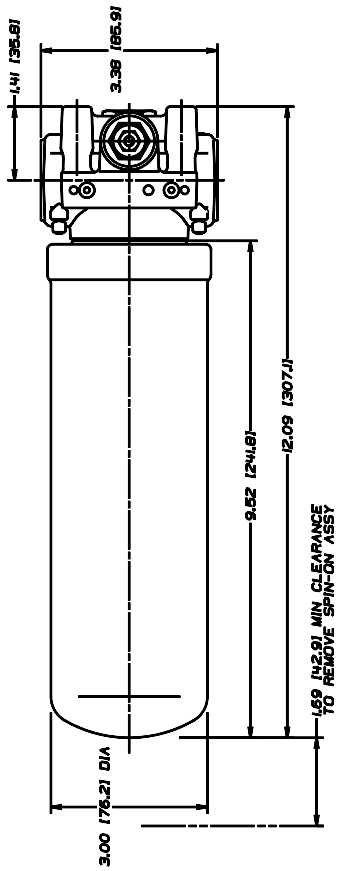
Operating Temperatures
- -20°F to 250°F / -29°C to 121°C

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

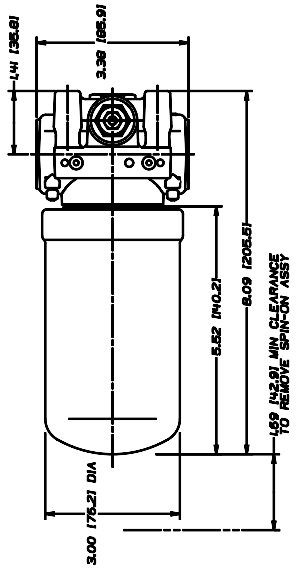
Donaldson

Assembly - Side View

Long Assembly



Short Assembly

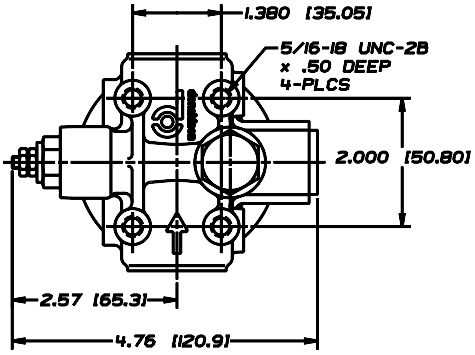


Applications:

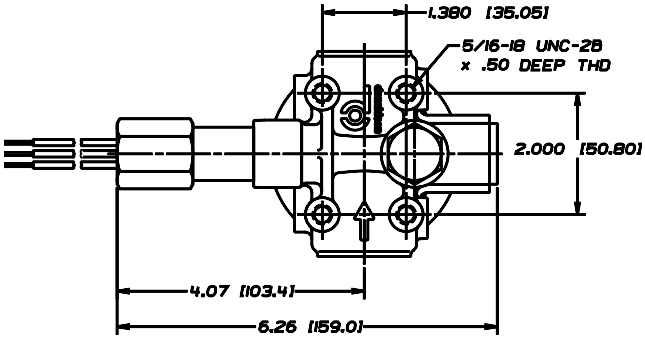
Pilot Control Circuits
Refrigeration Compressor Circuits
Hydrostatic Transmission — Charge Pumps

Head with Indicators

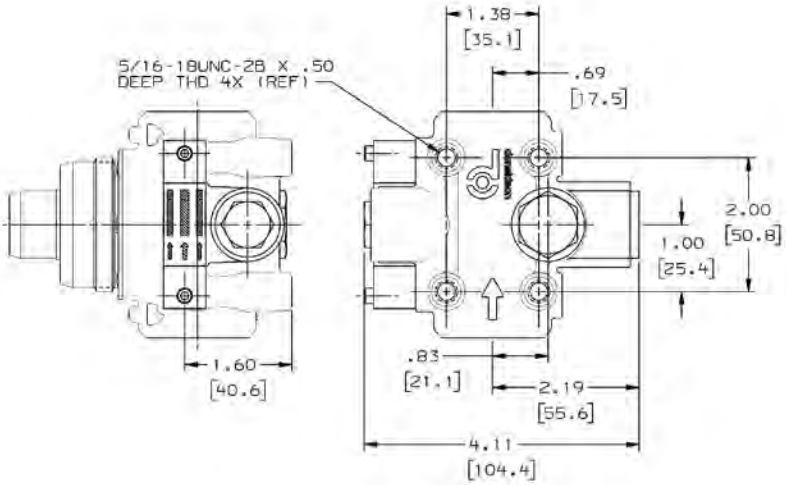
Head with DC Electrical Indicator



Head with AC/DC Electrical Indicator



Head with Visual Indicator



All dimensions above are shown in inches [millimeters]

Medium Pressure Filters

Donaldson

HMK03 Components

Element Choices

Media No.	Media Tech	$B_{x(c)}$ = 1000 Rating	Length (in.)	(mm)	Part No.	Seal Material
No. 1	Synteq®	6 µm	5.5	140	P170306	BunaN
			9.5	242	P170307	BunaN
No. 2	Synteq	9 µm	5.5	140	P170308	BunaN
			9.5	242	P170309	BunaN
No. 2½	Synteq	10 µm	9.5	242	P176107	BunaN
No. 3	Synteq	14 µm	9.5	242	P173702	BunaN
No. 4	Synteq	20 µm	5.5	140	P170310	BunaN
			9.5	242	P170311	BunaN
No. 9	Synteq	23 µm	5.5	140	P170312	BunaN
			9.5	242	P170313	BunaN

Filter Notes

- Synteq filter media is compatible with petroleum based fluids, most phosphate esters, water oil emulsions, and HWCF (high water content fluids).

HMK03 Head

Port Size	Bypass Rating	Indicator	Head Part No.
¾" SAE-12 O-Ring	No Bypass	None*	P170327
	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[2]	Description[1]
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

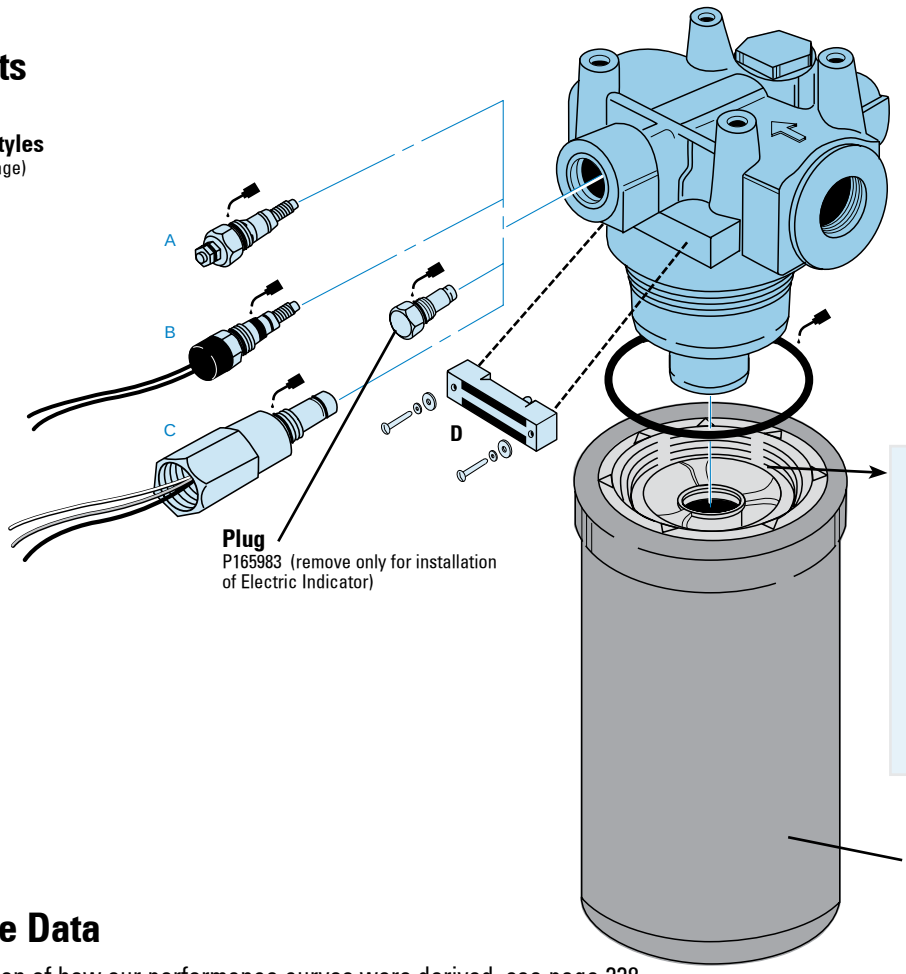
[1] All electric models have a maximum operating temperature of 250°F/121°C.

[2] See illustration of indicator styles on next page and complete details on all service indicators on pages 151-153.

Donaldson

Service Parts

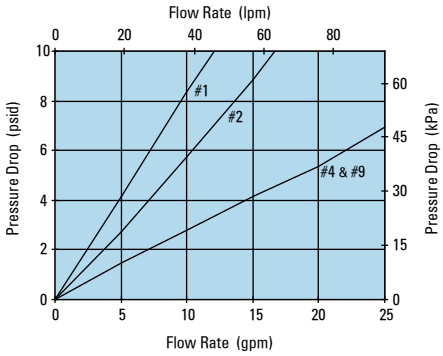
Service Indicator Styles
(See table on opposite page)



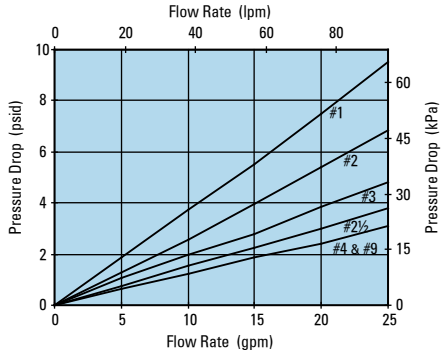
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

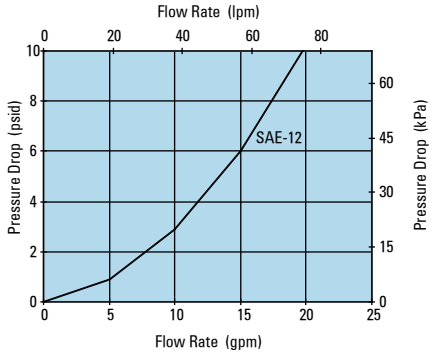
HMK03 Filter Only (Synthetic, 5.5"/140mm)



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



HMK03 Head Only



Donaldson

HMK04/24 DURAMAX® Spin-Ons

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 *gpm* 130 *lpm*	60 *gpm* 230 *lpm*

Synteq®

HMK24

HMK04

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. BunaN seals are standard; Viton® seals are available on some models.

Since both HMK04 and HMK24 models use the same replacement filter elements, 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 elements.

A full range of media options are available, using Donaldson's exclusive **Synteq®** synthetic media designed especially for liquid filtration. Likewise, select the exact indicator types and bypass options to suit your application.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Porting Sizes

HMK04
- SAE-12, -16 O-Ring
- ¾" & 1" NPT

HMK24
- SAE-20 O-Ring
- 1¼" SAE 4-Bolt

Assembly Weight
- HMK04 with short element: 3.9 lbs/1.8 kg
- HMK04 with long element: 4.8 lbs/2.2 kg
- HMK24: 13 lbs/ 5.9 kg

Replacement Filter Lengths
- 6" / 152*mm*
- 9.4" / 240*mm*

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

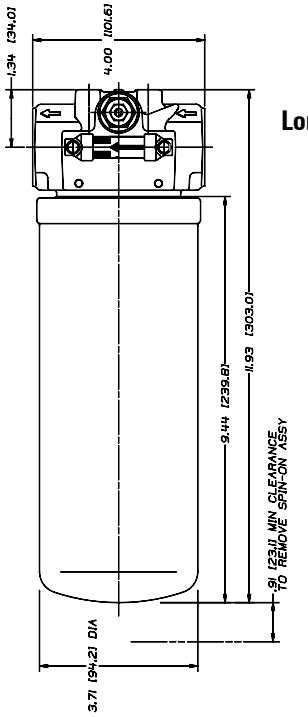
Operating Temperatures
- -20°F to 250°F / -29°C to 121°C (synthetic)
- -20°F to 225°F / -29°C to 107°C (cellulose)

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

Element Collapse Rating
- 150 psid / 10 bar
- 300 psid / 20 bar also available

Donaldson

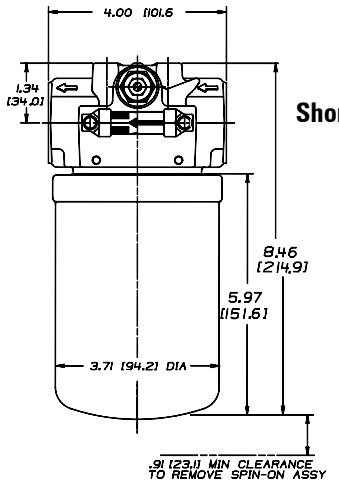
Assembly - Side View



Long Assembly

Applications:

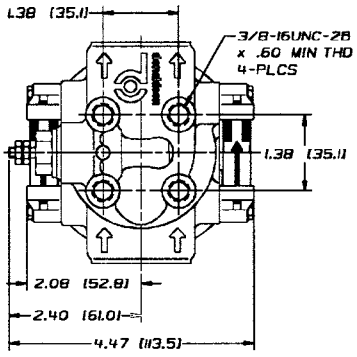
- Return-Lines
- Case Drains
- Side Loop Systems
- Bearing/Gear Lube Systems
- Hydrostatic Charge Pumps
- Power Transmissions
- Cooling Circuits
- Fuel Transfer



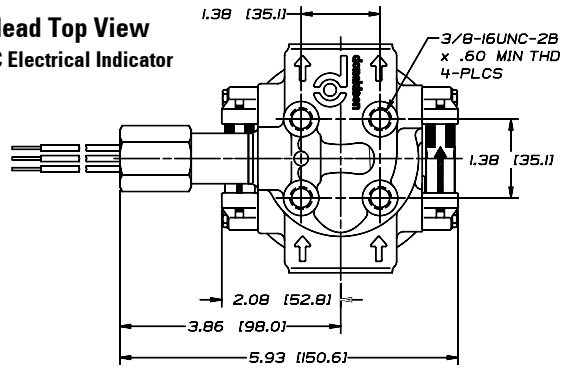
Short Assembly

Heads - Top & Side Views

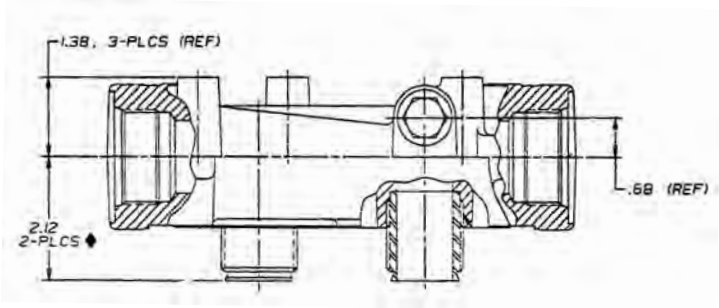
HMK04 Head Top View
with DC Electrical Indicator



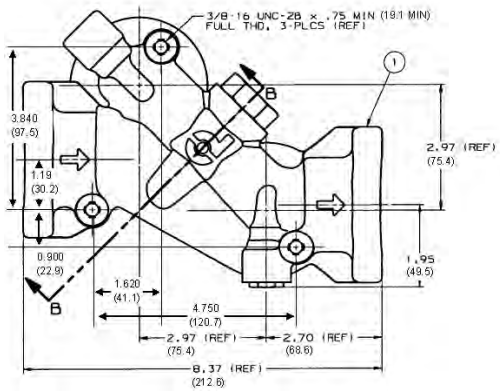
HMK04 Head Top View
with AC/DC Electrical Indicator



HMK24 Head Side View



HMK24 Head Top View



All dimensions above are shown in inches [millimeters]

Medium Pressure Filters

Donaldson

HMK04/24 Components

Spin-On Elements for both HMK04 and HMK24

Media	$B_{x(c)}$ = 1000 Rating	Media Technology	Length (in.)		Part No.
No. ½	<4 µm	Synteq®	9.4	240	P165185[1] Viton Seal
No. 1	6 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
			6	152	P566047[2] Plurasafe® EnBio TC® S
			9.4	240	P176566
		300 psi collapse	9.4	240	P173737
No. 3	14 µm	Synteq 300 psi collapse	9.4	240	P170950
No. 4	20 µm	Synteq	6	152	P163542
		300 psi collapse	9.4	240	P163555
			6	152	P164375
			9.4	240	P164378
No. 6	13 µm	Synteq	9.4	240	P164056[1] Viton Seal
No. 7	33 µm	Synteq	6	152	P164381
			9.4	240	P164384
			9.4	240	P566048[2] Plurasafe® EnBio TC® S
No 9	23 µm	Synteq	6	152	P163315
			9.4	240	P163567
No. 16	22 µm	Synteq	9.4	240	P164059[1] Viton Seal
No. 20	>50 µm	Synteq	6	152	P165335
			9.4	240	P165338
WA	na	Water Removal	9.4	240	P560584

Mix 'n Match to Get What You Need

Donaldson's Mix 'n 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 that exactly suits your cleanliness requirements.

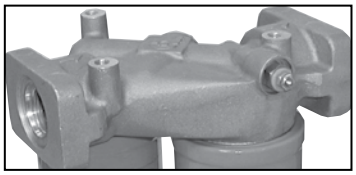
Notes on Spin-On Elements

- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
- Standard element collapse rating is 150 psi, except as noted.

[1] Filters with seals made of BunaN 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.

[2] P566047 and P566048 is compatible with Plurasafe® EnBio TC® S (polyalkylene glycol) fluids. Plurasafe® EnBio TC® S are registered trademarks of BASF and EnBio Industries, Inc.

Head Choices for HMK24 (double)



Port Size	Bypass Rating	Indicator Options[1]	Part No.
SAE-20 O-Ring	None	A,B,C	P179609
1¼" SAE 4-Bolt	50 psi	A,B,C	P179582

[1] Reference illustration on next page for indicator styles.

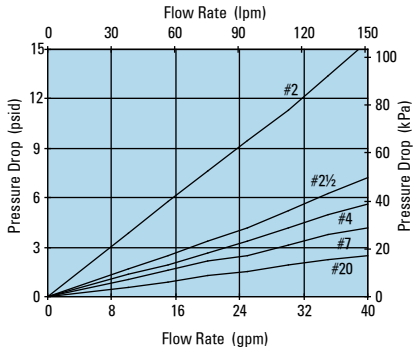
IMPORTANT:

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

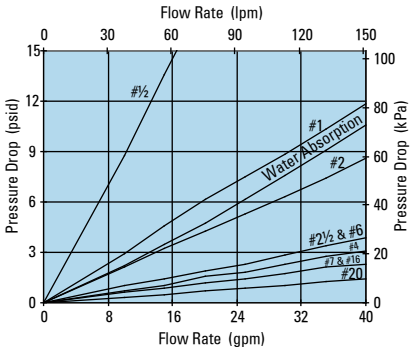
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

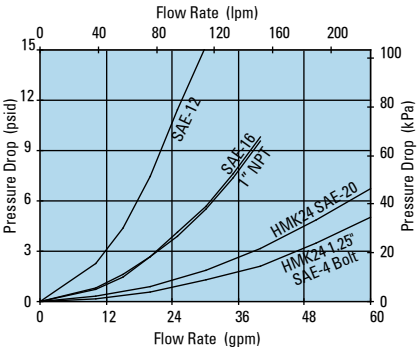
HMK04 Filter Only (Synthetic, 6"/152mm)



HMK04 Filter Only (Synthetic, 9.4"/240mm)



HMK04 Head Only



Donaldson

Head Choices for HMK04 (single)

Port Size	Bypass Rating	Standard Indicator Style & Location[1,2]	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
	No Bypass	D (Visual), Left Side (50 psi)	None	P173750
SAE-12 O-Ring (3 ports)	50 psi 345 kPa	A (Electrical)	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	None	None	P163681
	172 kPa	D (Visual), Left Side	None	P166417
		D (Visual), Both Sides	A, B, C	P166088
		E (Electrical)	None	P176568
		A (Electrical)	B, C	P165537
	No Bypass	D (Visual), Both Sides (25 psi)	A, B, C	P166664
		A (Electrical)	B, C	P166902
	50 psi	D (Visual, Right Side)	All	P179381
	No Bypass	None	None	P164667
	50 psi	None	None	P167201
	345 kPa	A (Electrical)	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

Head Notes

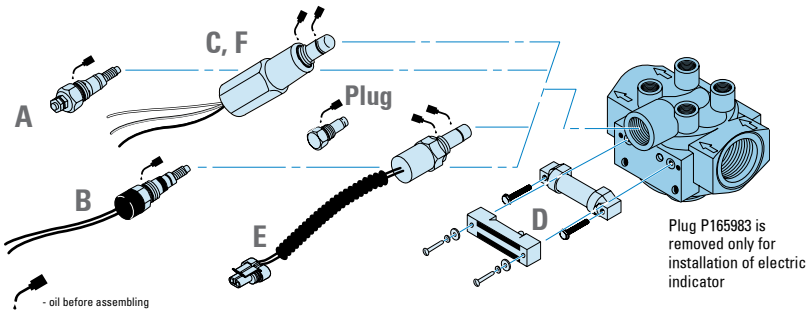
1 Reference illustration below for indicator styles.
2 Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.

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

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[1]

Use with Bypass Valve Pressure of:	Indicator Part No.	Style[3]	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)[2]

Use with Bypass Valve Pressure of:	Indicator Part No.	Style[3]
15 psi / 103 kPa	P162642	D
25 psi / 172. kPa	P162696	D
50 psi / 345 kPa	P167580	D
n/a (blank plate)	P165984	n/a

NOTE: PSI is marked on the face of the visual indicators.

Indicator Notes

1 All electric models have a maximum operating temperature of 250°F / 121°C.
2 All non-electric models have a maximum operating temperature of 180°F / 82°C.
3 Indicator styles are illustrated above and detailed on pages 151-153.

Donaldson

HMK05/25 DURAMAX® Spin-Ons

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** 50 *gpm* 189 *lpm*	**HMK25** 100 *gpm* 378 *lpm*

Synteq®

HMK25

HMK05

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. BunaN seals are standard. Seals made of fluorocarbon (such as Viton® from DuPont Dow Elastomers or Fluorel™ from 3M Company) are available. Since both HMK05 and HMK25 models use the same replacement filter elements, they make a great team within your application. Both filters feature identical pressure ratings, but the HMK25 double element 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 elements.

Take advantage of Donaldson's Mix 'n 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.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Porting sizes

HMK05	HMK25
• 1¼" NPT	• 1½" NPT
• SAE-20 O-Ring	• 1½" SAE 4-Bolt Flange
	• SAE-24 O-Ring

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

Replacement Filter Lengths
- 11.63" / 295.4*mm*
- 14.2" / 361*mm*

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

Element Collapse Ratings
- 200 *psi / 13.8 bar*

Filter Head Construction
- Standard Head Cast Aluminum
- Ductile Iron Available in HMK25

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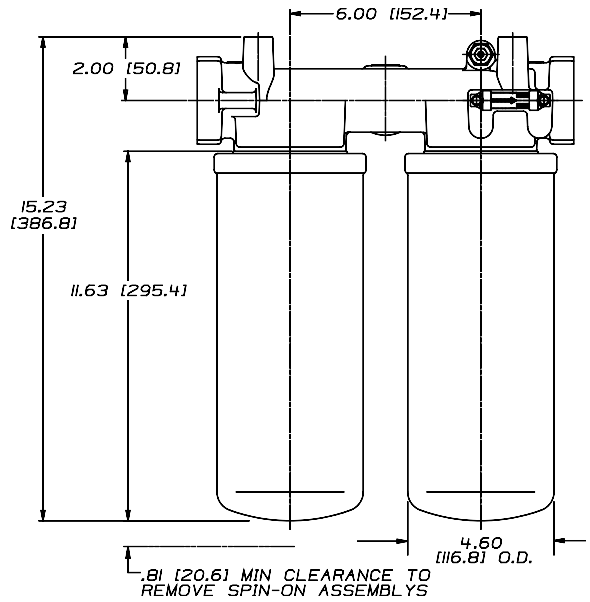
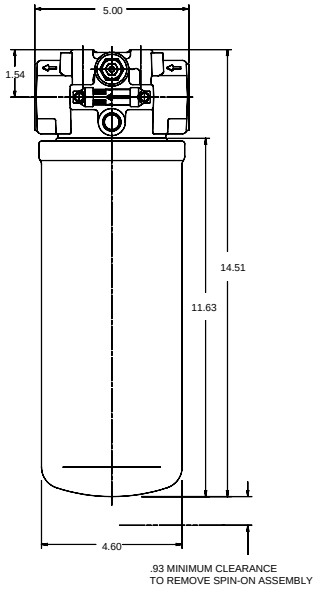
Assembly - Side View

HMK25



HMK05

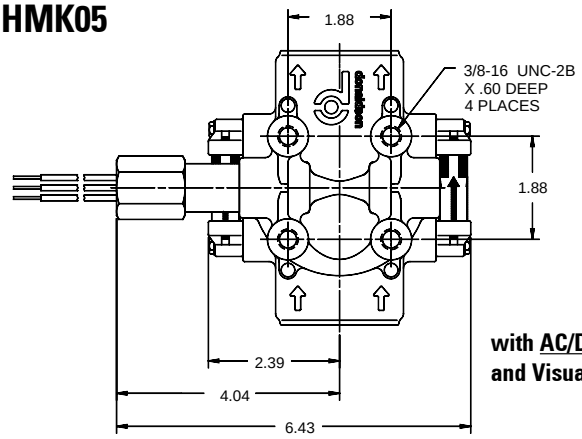


Applications:

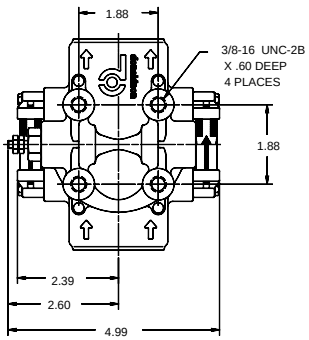
- Case Drains
- Fluid Conditioning
- Power Transmissions
- Return-Line & Side Loop Systems
- Hydrostatic Charge Pumps
- Lube Oil Systems
- Cooling Circuits
- Fuel Transfer

Head - Top View

HMK05

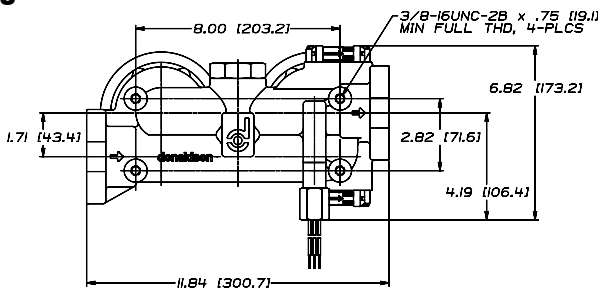


with AC/DC Electrical and Visual Indicators

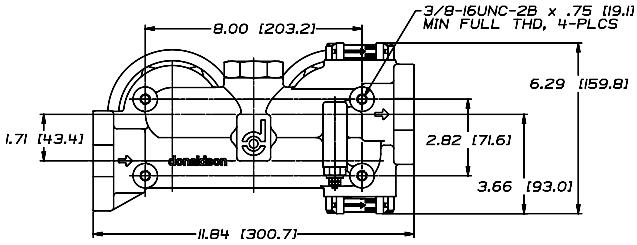


with DC Electrical and Visual Indicators

HMK25



with AC/DC Electrical and Visual Indicators



with DC Electrical and Visual Indicators

All dimensions above are shown in inches [millimeters]

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HMK05/25 Components

Spin-On Elements for HMK05 and HMK25

Media Number	Media Type	$B_{x(c)}$ = 1000 Rating	Length (in./mm)	Part No.
No. ½	Synteq®	<4 µm	14.2/361	P564468
No. 1	Synteq	6 µm	11.6/294	P170906
			11.6/294	P171273[1] Viton
No. 2	Synteq	9 µm	11.6/294	P165675
			11.6/294	P171274[1] Viton
			14.2/361	P179763
No. 2½	Synteq	10 µm	11.6/294	P176567
No. 3	Synteq	14 µm	14.2/361	P170949
No. 4	Synteq	20 µm	7.6/193	P176207
			11.6/294	P165659
			11.6/294	P171275[1] Viton
No. 9	Synteq	23 µm	11.6/294	P165569
			11.6/294	P171276[1] Viton
			11.6/294	P566049[2] Plurasafe® EnBio TC® S
			14.2/36	1173789
No. 20	Synteq	>50 µm	11.6/294	P165672
			14.2/361	P170546

Head Choices are shown on page 77.

Choose the dual head, single head, or 3-port head

Media Number	Media Technology	Beta Rating	Length (in./mm)	Part No.
No. 149	Wiremesh	150 µm nominal	11.6/294	P173943
	Water Removal	na	11.6/294	P179075

Filter Notes

• Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.

[1] Filters with seals made of BunaN 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. (Viton® is a registered trademark of DuPont Dow Elastomers.)Filters with seals made of BunaN are appropriate for most applications involving petroleum oil.

[2] P566049 is compatible with Plurasafe® EnBio TC® S (polyalkylene glycol) fluids. Plurasafe® EnBio TC® S are registered trademarks of BASF and EnBio Industries, Inc.

In-Oil Service Indicator Options (illustrated on page 78)

Electric Models[1]

Use with Bypass Valve Pressure of:	Indicator Part No.	Style[3]	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)[2]

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

Indicator Notes

[1] All electric models have a maximum operating temperature of 250°F/ 114°C.
[2] All non-electric models have a maximum operating temperature of 180°F/ 82°C.
[3] Indicator styles are illustrated above and detailed on pages 151-153.

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HMK05/25 Components

Head Choices for HMK05 (single)

Port Size	Bypass Rating	Standard Indicator Style & Location[1]	Indicator Options[2]	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[1]	Indicator Options[2]	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*

* Ductile Iron Construction

Dual Head

Head Choice for HMK05 (3rd port return)

Port Size	Bypass Rating	Indicator Style & Location[1]	Indicator Options[2]	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

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

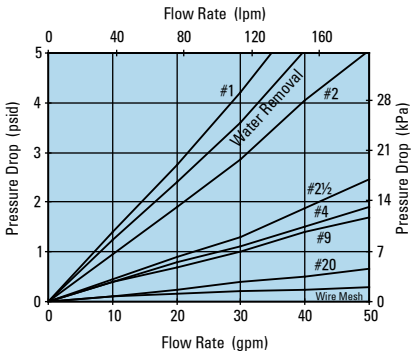
Head Notes

[1] 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.
[2] May be purchased separately. See indicator illustrations on page 78.

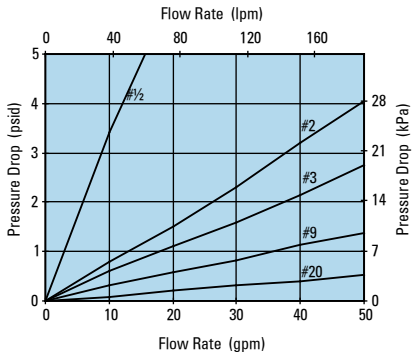
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

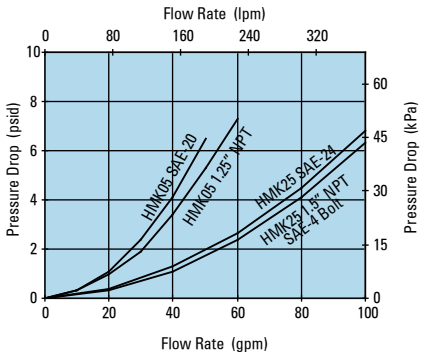
HMK05 Filter Only (Synthetic, 11.6"/294mm)



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



HMK05 Head Only



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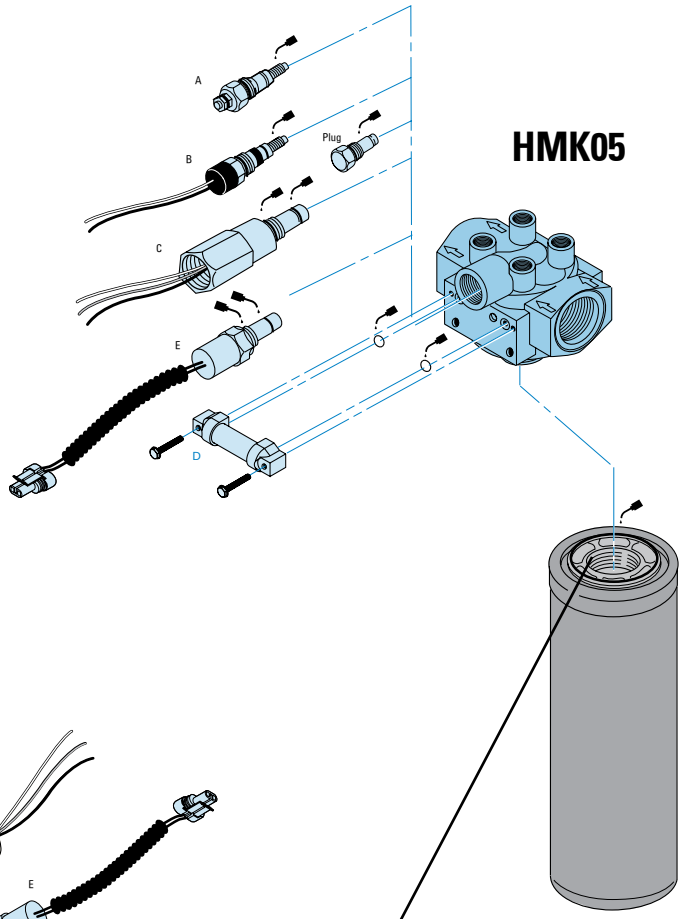
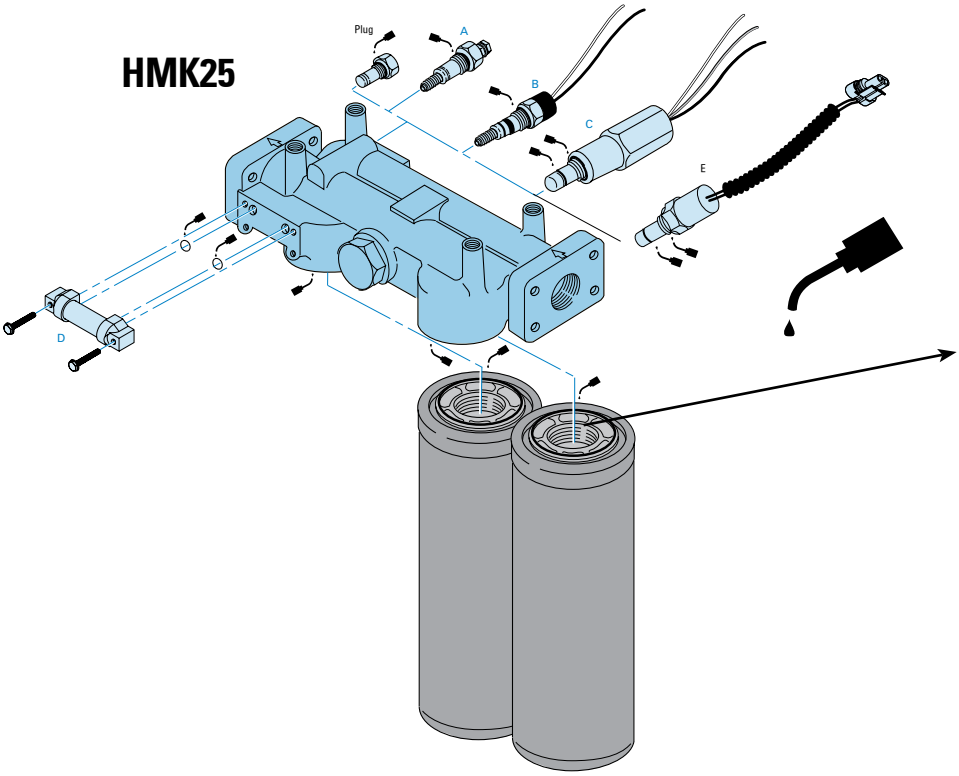
HMK05/25 Service Parts

See how to bank several of these dual heads together to create a higher flow circuit, described on the next page.

HMK05



HMK25



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

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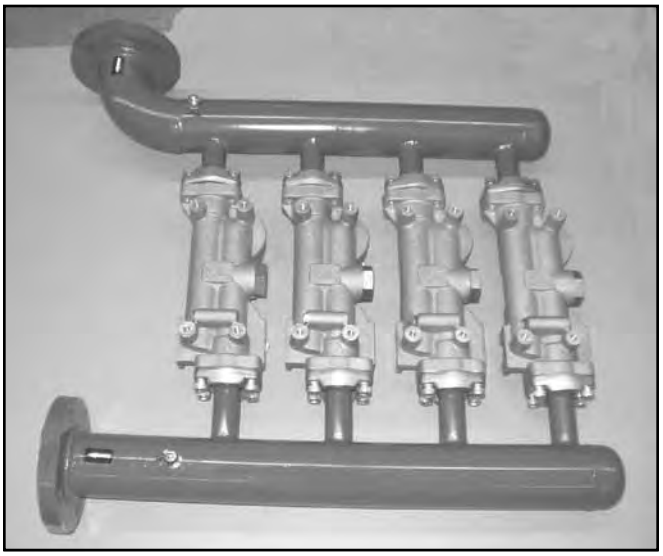
Banks of HMK25 Heads with Manifold Enable Higher Flow or Higher Viscosity



If you need to filter hydraulic fluid at higher flow rates or filter higher viscosity oil—yet want the economy and convenience of spin-on filters, consider banking several Donaldson HMK05 dual heads together with our manifold, as shown on right.

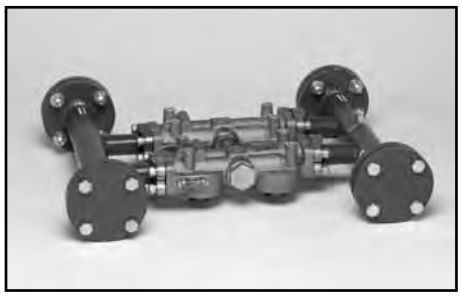
This arrangement can also be used to achieve higher dirt-holding capacity—while retaining the convenience of spin-on filters that are easy to change and require less clean-up.

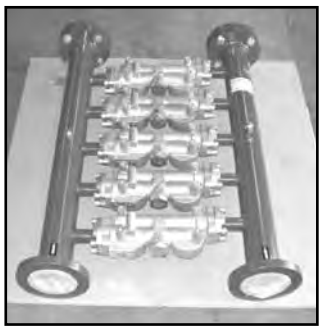
The heads are piped together, sharing common inlet and outlet pipes.

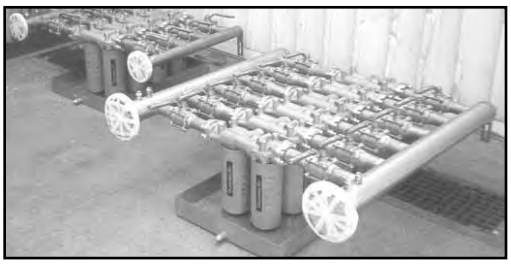
Whereas a single HMK25 can potentially handle 100 gpm/379 lpm, two HMK25 filters together (with common inlet/outlet pipes) can potentially handle 200 gpm/757 lpm.

The multiple HMK25 configuration is ideal for any bulk oil storage tank—like the kind found at refineries, mines, oil processing plants, and hundreds of other operations that use a lot of oil. Oil stored in tanks can pick up bacteria, metal particles, and other contamination that must be filtered out of the oil before it's used in expensive machinery.

HMK25 dual heads specs are on page 77; manifolds are custom made to suit your requirements. Call your Authorized Donaldson Distributor for further information on Donaldson manifold options.







COST-EFFECTIVE DUPLEX ALTERNATIVE: In this application, the manifolds have on/off valves so that filters can be changed without shutting down the whole system.

Donaldson

HNK DURAMAX® Spin-Ons

Working Pressures to:	500 *psi* 3450 kPa 34.5 bar
Rated Static Burst to:	1000 *psi* 6895 kPa 69 bar
Flow Range to:	50 *gpm* *189 lpm*

Features

- Applications include hydrostatic charge side filtration, pilot circuits, powershift transmissions and mid-pressure kidney loop circuits.
- Utilizes Synteq filter media for high filtration efficiency and higher dust-holding capacity.
- Improved performance including higher burst, greater fatigue strength and longer filter life.
- Dual purpose design – one head assembly fits both spin-on and bowl cartridge filter.
- Patent pending seal provides proprietary fit.

Beta Rating
- Performance to $ß_{9(c)}$=1000

Porting sizes
- 04: SAE-12 / SAE-16
- 05: SAE-20

Assembly Weight
- 04: 5.3 lbs / 2.4 kg
- 05: 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

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

Operating Temperatures
- -20° to 250°F (-29° to 121°C)

Element Collapse Ratings
- 235 psi / 1621 kPa / 16.2 bar

Replacement Cartridge Lengths
- 04 short: 5.26" / 133.7 mm
- 04 long: 7.52" / 191.0 mm
- 05 short: 10.54" / 267.8 mm
- 05 long: 13.13" / 333.4 mm

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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

Spin-On Element Choices

Media Number	$B_{x(c)}$ = 1000 Rating	Length (in./mm)	Part No.	Comments
#2	9 µm	5.97/151.7	P569203	HNK04
#2	9 µm	9.44/239.8	P569204	HNK04
#3	14 µm	5.97/151.7	P569205	HNK04
#3	14 µm	9.44/239.8	P569206	HNK04
#2	9 µm	11.63/295.4	P569209	HNK05
#2	9 µm	14.24/361.7	P569210	HNK05
#3	14 µm	11.63/295.4	P569211	HNK05
#3	14 µm	14.24/361.7	P569212	HNK05

Housing Choices

Element Length (in./mm)	Part Number	Comments
5.26/133.7	P568840	HNK04
7.52/191.0	P568841	HNK04
10.54/267.8	P568848	HNK05
13.13/333.4	P568849	HNK05*

Indicator Choices

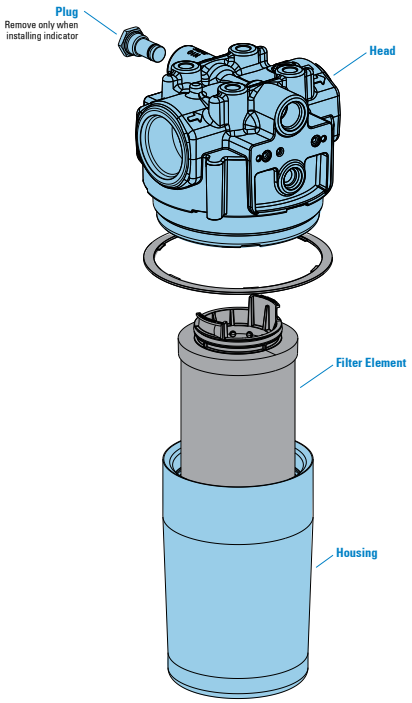
Set Point / Type	Part Number
40.4 psi / 2.8 bar	P165194

Cartridge Element Choices

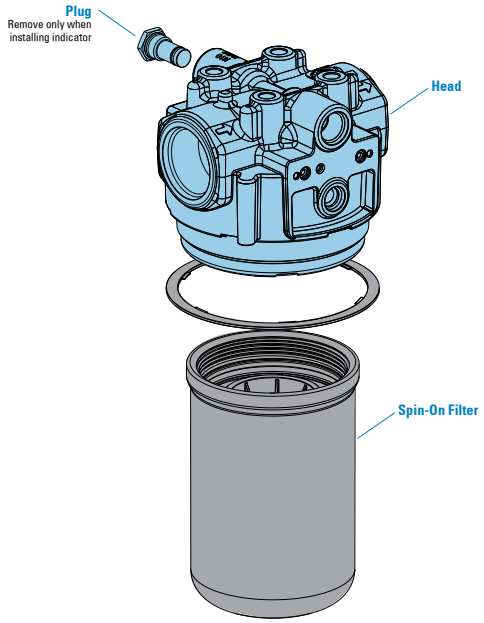
Media Number	$B_{x(c)}$ = 1000 Rating	Length (in./mm)	Part No.	Comments
#2	9 µm	5.26/133.7	P568842	HNK04
#2	9 µm	7.52/191.0	P568843	HNK04
#3	14 µm	5.26/133.7	P568844	HNK04
#3	14 µm	7.52/191.0	P568845	HNK04
#2	9 µm	10.54/267.8	P568850	HNK05
#2	9 µm	13.13/333.4	P568851	HNK05*
#3	14 µm	10.54/267.8	P568852	HNK05
#3	14 µm	13.13/333.4	P568853	HNK05*

* Check for availablility.

HNK Cartridge Service Parts



HNK Spin-On Service Parts



Donaldson

W061

Working Pressures to:	800 *psi* 5515 kPa 55 bar
Rated Static Burst to:	1500 *psi* 10,342 kPa 100 bar
Fatigue Pressure Rating:	400 *psi* 28 bar
Flow Range to:	100 *gpm* *379 lpm*

Features

The W061 filter assembly contains the popular HF3 filter element. Quick filter changeouts are accomplished with the use of our easily serviceable ring assembly. Donaldson Triboguard™ 4-layer media is offered in a variety of designs. Five different media grades are offered Donaldson elements 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 bowl length options for design flexibility
- Head Material: Cast Iron
- Bowl Material: Steel
- Bleed plug in head

Beta Rating
- Performance to ß$<_{4(c)}$=1000

Porting sizes
- SAE-12 O-Ring
- SAE-16 O-Ring

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

Replacement Spin-On 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)

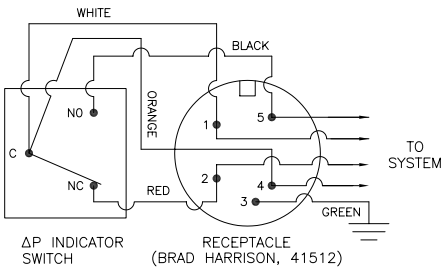
Element Collapse Ratings
- 150 psi / 1034 kPa / 10.3 bar (standard)

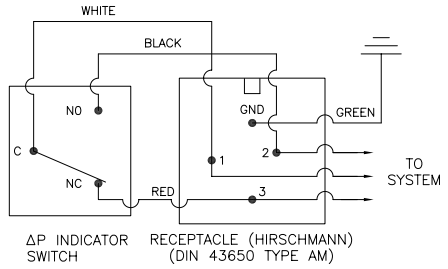
Donaldson

Indicator Switch Schematic Wiring Diagram

Indicator Switch Schematic Wiring Diagram

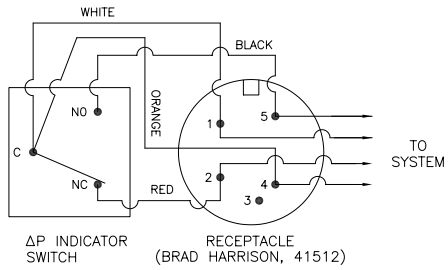
Aluminum Electrical Housings

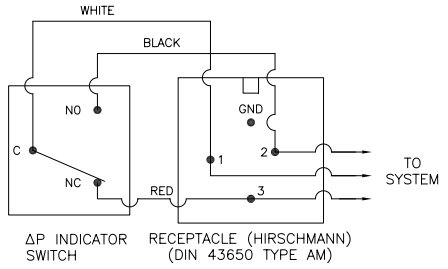




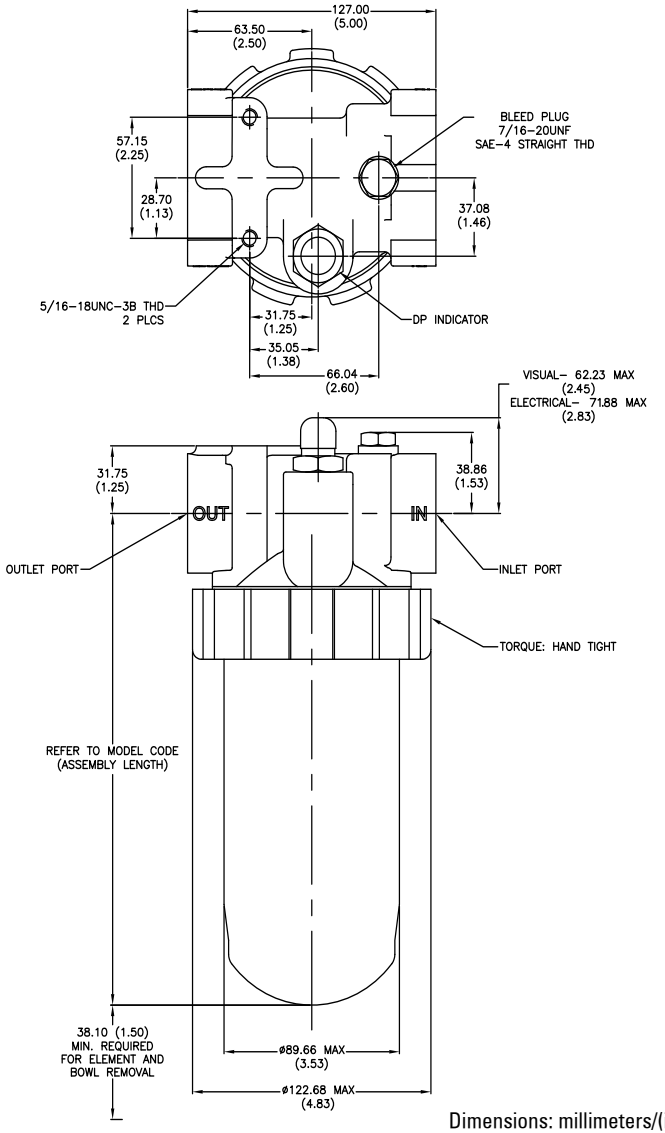
Note: The female plug (connector) is to be furnished by customer.

Plastic Electrical Housings





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



Dimensions: millimeters/(inches)

Differential Indicators:
Indicators are designed to actuate at approximately 80% byass 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.

Donaldson

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2 µm	<4 µm	4/116.7	DT-9600-4-2UM	9600 Series
5 µm	5 µm	4/116.7	DT-9600-4-5UM	9600 Series
8 µm	8 µm	4/116.7	DT-9600-4-8UM	9600 Series
14 µm	14 µm	4/116.7	DT-9600-4-14UM	9600 Series
25 µm	25 µm	4/116.7	DT-9600-4-25UM	9600 Series
2 µm	<4 µm	8/208.8	DT-9600-8-2UM	9600 Series
5 µm	5 µm	8/208.8	DT-9600-8-5UM	9600 Series
8 µm	8 µm	8/208.8	DT-9600-8-8UM	9600 Series
14 µm	14 µm	8/208.8	DT-9600-8-14UM	9600 Series
25 µm	25 µm	8/208.8	DT-9600-8-25UM	9600 Series
2 µm	<4 µm	13/327	DX2-9600-8-2UM	9600 Series: DX2 Non-Metallic Dual Element
5 µm	5 µm	8/209	DX2-9600-8-5UM	9600 Series: DX2 Non-Metallic Dual Element
8 µm	8 µm	8/209	DX2-9600-8-8UM	9600 Series: DX2 Non-Metallic Dual Element
14 µm	14 µm	8/209	DX2-9600-8-14UM	9600 Series: DX2 Non-Metallic Dual Element
2 µm	<4 µm	13/327.8	DT-9600-13-2UM	9600 Series
5 µm	5 µm	13/327.8	DT-9600-13-5UM	9600 Series
8 µm	8 µm	13/327.8	DT-9600-13-8UM	9600 Series
14 µm	14 µm	13/327.8	DT-9600-13-14UM	9600 Series
25 µm	25 µm	13/327.8	DT-9600-13-25UM	9600 Series
2 µm	<4 µm	13/327	DX2-9600-13-2UM	DX2 Non-Metallic Core Dual Element
5 µm	5 µm	13/327	DX2-9600-13-5UM	DX2 Non-Metallic Core Dual Element
8 µm	8 µm	13/327	DX2-9600-13-8UM	DX2 Non-Metallic Core Dual Element
14 µm	14 µm	13/327	DX2-9600-13-14UM	DX2 Non-Metallic Core Dual Element
WA	B>30$_{(c)}$ = 200	8/209	P569528	Absorbs 130 ml water @ 25 psid
WA	B>30$_{(c)}$ = 200	13/327	P569529	Absorbs 220 ml water @ 25 psid

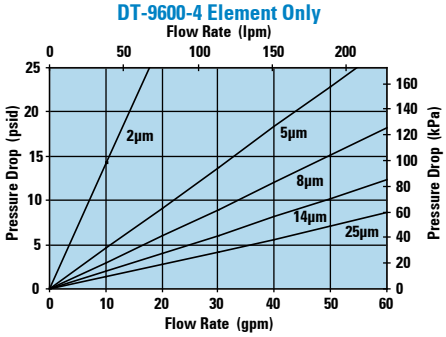
Filter Notes:

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- Viton® seals are standard on all Donaldson Triboguard elements.

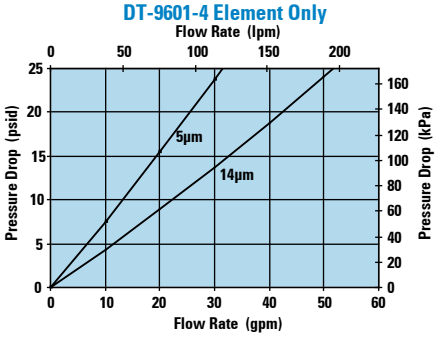
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

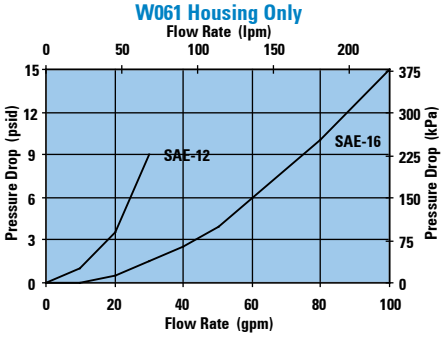
DT-9600-4 Element Only



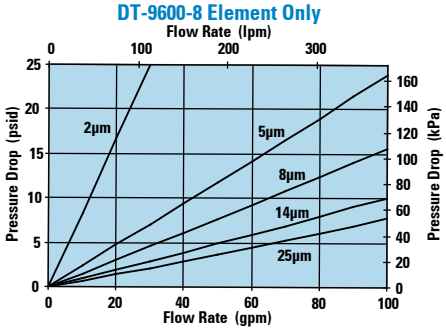
DT-9601-4 Element Only



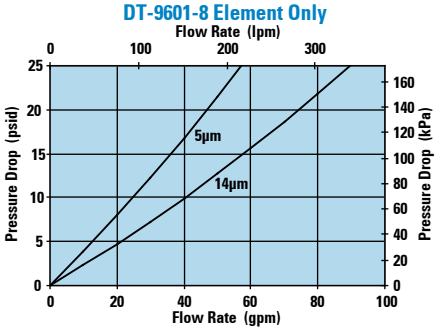
W061 Housing Only



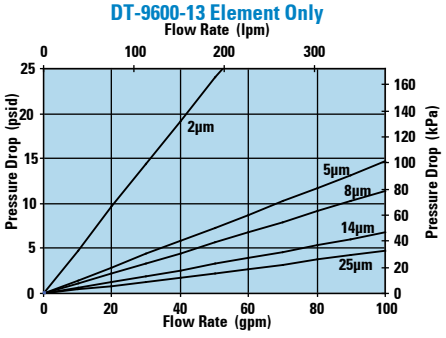
DT-9600-8 Element Only



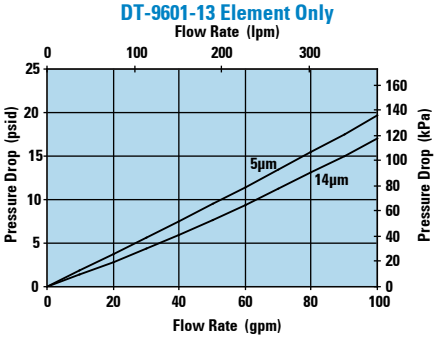
DT-9601-8 Element Only



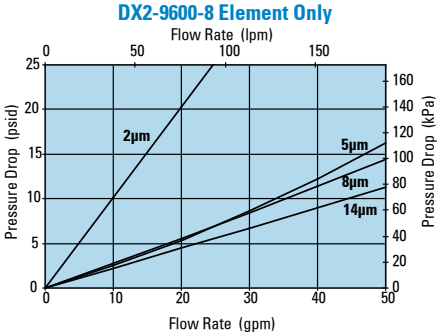
DT-9600-13 Element Only



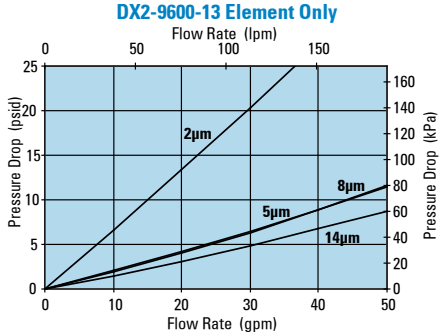
DT-9601-13 Element Only



DX2-9600-8 Element Only



DX2-9600-13 Element Only



Donaldson

Ordering Guide

Filter Assembly	W061	1	A	4	L | N	B	2
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6	TABLE 7
Service Element	Elements ordered separately. See page 84 for element choices.						

Table 1

Filter Assembly / Service Element	
CODE	DESCRIPTION
W061	Assembly

Table 2

Element Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
3	600 psid for housing without bypass valve

Table 3

Port Size Options	
CODE	PORT SIZE
A	1-1/16" - 12 UN (SAE-12)
B	1-5/16" - 12 UN (SAE-16)

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	DP 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)

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 & Element Length	
CODE (LGTH)	ELEMENT LENGTH
1 (7.43")	4.0"
2 (11.06")	8.0"
4 (15.82")	13.0"

Note: Information concerning fluid cleanliness codes is in the Media Grade Selection Guide located in the blue pages.

Metric Porting Available

Change W061 to G061

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 threads

Porting code G becomes 1-1/4" SAE 4 bolt flange with M10 threads

Donaldson

High Pressure Filters

Where and Why Used

Donaldson heavy-duty high pressure filters are positioned between pumps and critical hydraulic components such as cylinders, motors and valves.

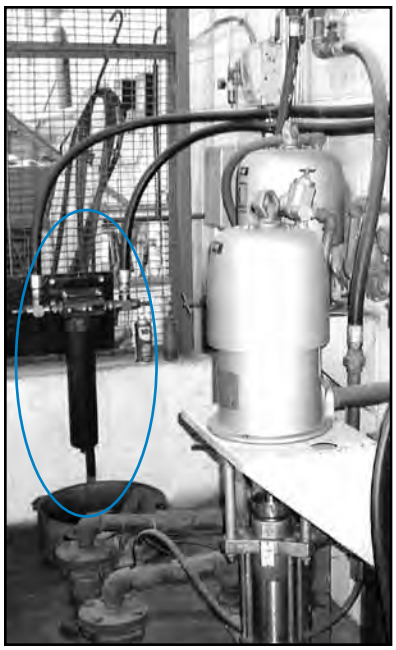
All Donaldson heavy-duty pressure filters contain our SYNTEQ® synthetic filter media, specially developed for high efficiency liquid filtration. Working pressures range from 2000 psi up to 6090 psi.

Donaldson hydraulic filters protect hydraulic presses like these and many other types of production machinery.

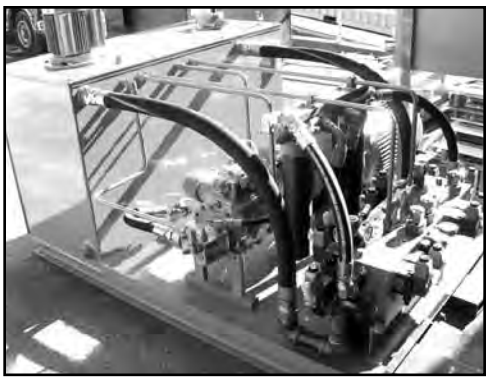
Donaldson.

Hydraulic Series	Flow Range	Pressure (NFPA/t3.10.17) Working	Static	Porting Types	Media Choices
HPK02	0-20 gpm 0-75 lpm	2000 psi 13790 kPa 137.9 bar	4500 psi 31028 kPa 310.3 bar	SAE-12 O-Ring	Synteq® Synthetic Media
W350	0-50 gpm 0-189 lpm	3000 psi 20685 kPa 207 bar	7500 psi 51713 kPa 517 bar	SAE-12, -16 O-Ring	Synteq Synthetic Media
FPK02	0-25 gpm 0-95 lpm	6090 psi 42000 kPa 420 bar	9135 psi 63000 kPa 630 bar	SAE-12 O-Ring	Synteq Synthetic Media
W440	0-20 gpm 0-75 lpm	4000 psi 27580 kPa 276 bar	10000 psi 68950 kPa 690 bar	Manifold Mount	Synteq Synthetic Media
HPK03	0-60 gpm 0-227 lpm	3000 psi 20685 kPa 206.9 bar	6000 psi 41370 kPa 413.8 bar	SAE-12 O-Ring SAE-16 O-Ring	Synteq Synthetic Media or Stainless Steel Wiremesh
FPK04	0-100 gpm 0-379 lpm	4350 psi 300 bar	9135 psi 630 bar	SAE-20 O-Ring	Synteq Synthetic Media
HPK04	0-120 gpm 0-454 lpm	6000 psi 41370 kPa 413.8 bar	12000 psi 82740 kPa 827.6 bar	SAE-20, -24 O-Ring 1¼", 1½" SAE 4-Bolt Flange Code 61 & 62	Synteq Synthetic Media or Stainless Steel Wiremesh
HPK05	0-200 gpm 0-757 lpm	3000 psi 20685 kPa 206.9 bar	6000 psi 41370 kPa 413.8 bar	2" SAE 4-Bolt Flange	Synteq Synthetic Media
W451	0-150 gpm 0-568 lpm	4500 psi 31028 kPa 310 bar	13500 psi 93083 kPa 931 bar	SAE-24 O-Ring, Manifold Mount, 1½" SAE 4-Bolt Flange, Code 61 1½" SAE 4-Bolt Flange, Code 62	Synteq Synthetic Media

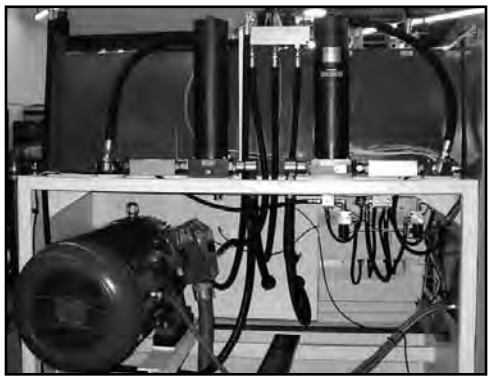
HPK04 at work in the factory



This HPK04 pressure filter cleans the oil coming from the bulk storage tanks into the factory. The oil is then used for operating hydraulic tools. Donaldson's exclusive Synteq® synthetic media removes contamination that is common with new oil.



This hydraulic filtration system for a Fine Blanking Press uses two 16" HPK04 filters and has a recirculation loop with an air-cooled heat exchanger.

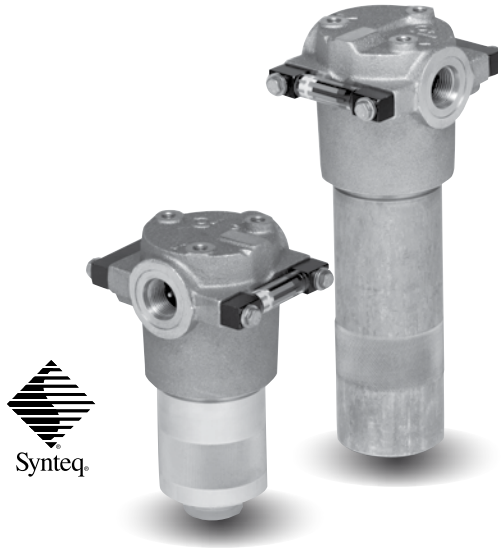


W451 filters clean the fluid on a hydraulic bench that tests hydraulic pumps, motors and cylinders using our highest performance Donaldson Triboguard™ elements.

Donaldson

HPK02

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*



Synteq®

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 'n 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 BunaN are available with HPK02.

All HF2-sized HPK02 filters contain Synteq®, our synthetic filter media designed especially for liquid filtration.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

T-Type Porting Sizes
- 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" / 111*mm*
- 8.12" / 206*mm*

Standard Bypass Ratings
- 50 *psi* / 345 kPa / 3.5 bar
- No Bypass

Operating Temperatures
- -20°F to 250°F / -29°C to 121°C

Element Collapse Ratings
- 150 *psi* / 1035 kPa / 10.6 bar (standard)
- 3000 *psi* / 20,700 kPa / 206.9 bar (high collapse)

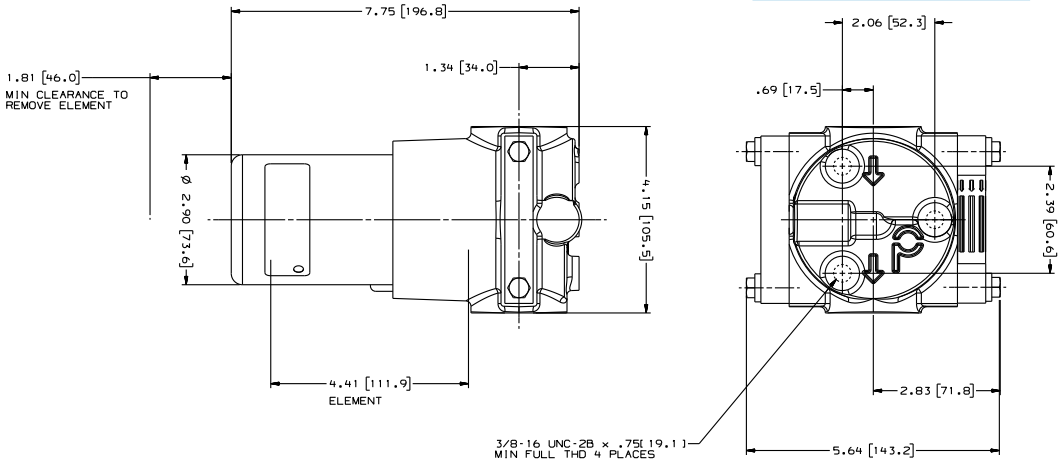
Donaldson

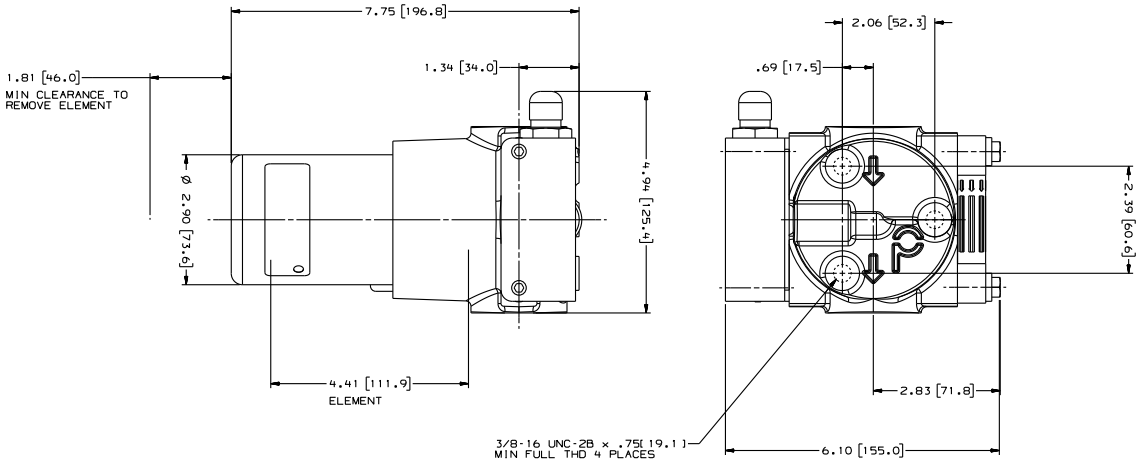
Assembly - Side View

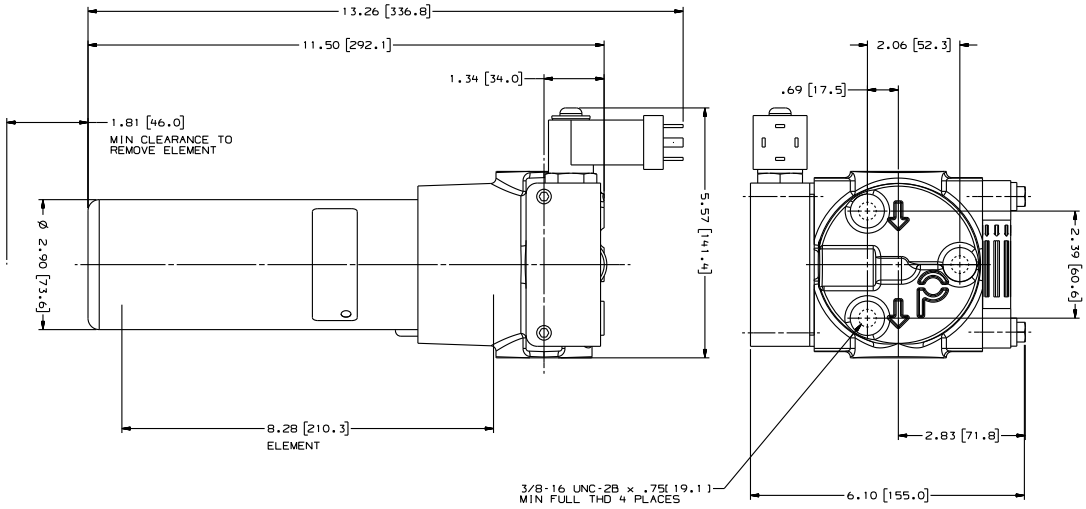
Applications:

Servo Valve Circuits
In-Plant & Mobile Equipment
Meets HF2 Specification
Power Steering Circuits
High Pressure Circuits

Head - Top View







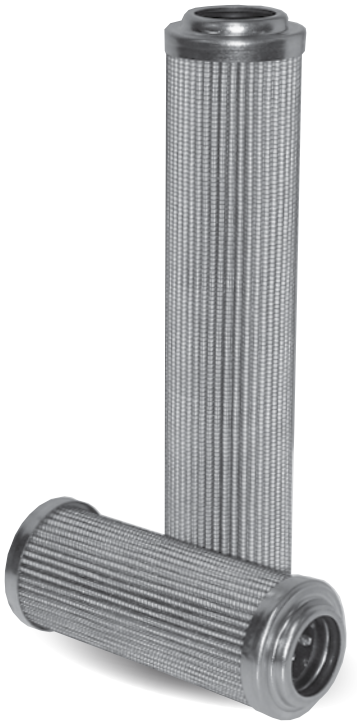
All dimensions above are shown in inches [millimeters]

Donaldson

HPK02 Components

Element Choices

Media Number	$B_{x(c)}$ = 1000 Rating	Length (in./mm)	Part No.	Comments
No. 1	6 µm	4.37/111	P169429	BunaN Seal
			P167180	Fluorocarbon Seal High Collapse
		8.12/203	P167838	BunaN Seal
			P167182	Fluorocarbon Seal High Collapse
No. 2	9 µm	4.37/111	P165041	BunaN Seal
		8.12/203	P165043	BunaN Seal
No. 2½	10 µm	4.37/111	P165006	BunaN Seal
			P167181	Fluorocarbon Seal High Collapse
		8.12/203	P165015	BunaN Seal
			P167183	Fluorocarbon Seal High Collapse
No. 9	23 µm	4.37/111	P165136	BunaN Seal
		8.12/203	P165138	BunaN 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 BunaN 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® from DuPont Dow Elastomers or Fluorel® from 3M Company.
- Donaldson "high collapse" elements, with their steel endcaps and wire-backed media, are rated to withstand up to 3000 psi/ 20,700 kPa before collapsing.
- The fluorcarbon seal/high collapse elements also use epoxy potting and media seam seals for added chemical compatibility.

Housing Choices

Length*	Part No.
short	P167443
long	P167452

* See dimensional drawings on page 89.

Head Choices

Port Size	Bypass Rating	Indicators[1]	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

[1] 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.

Donaldson

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2 µm	<4 µm	4/111.9	DT-9020-4-2UM	9020 Series
5 µm	5 µm	4/111.9	DT-9020-4-5UM	9020 Series
8 µm	8 µm	4/111.9	DT-9020-4-8UM	9020 Series
14 µm	14 µm	4/111.9	DT-9020-4-14UM	9020 Series
25 µm	25 µm	4/111.9	DT-9020-4-25UM	9020 Series
2 µm	<4 µm	8/210.3	DT-9020-8-2UM	9020 Series
5 µm	5 µm	8/210.3	DT-9020-8-5UM	9020 Series
8 µm	8 µm	8/210.3	DT-9020-8-8UM	9020 Series
14 µm	14 µm	8/210.3	DT-9020-8-14UM	9020 Series
25 µm	25 µm	8/210.3	DT-9020-8-25UM	9020 Series
5 µm	5 µm	4/113.2	DT-9021-4-5UM	9021 Series: High Collapse
14 µm	14 µm	4/113.2	DT-9021-4-14UM	9021 Series: High Collapse
5 µm	5 µm	8/207.2	DT-9021-8-5UM	9021 Series: High Collapse
14 µm	14 µm	8/207.2	DT-9021-8-14UM	9021 Series: High Collapse

Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum end caps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

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

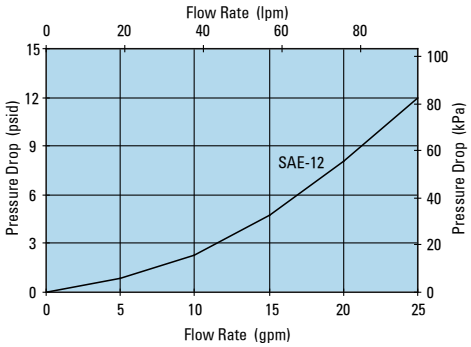
Part No.	Description
P567458	Visual/Electrical indicator with thermal lockout and surge, 35 psid/2.4 bar
P567459	Visual/Electrical indicator, with thermal lockout and surge 70 psid/4.8 bar
P567456	Pop-Up Visual Indicator, with thermal lockout and surge 35 psid/2.4 bar
P567457	Pop-Up Visual Indicator, 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

Donaldson

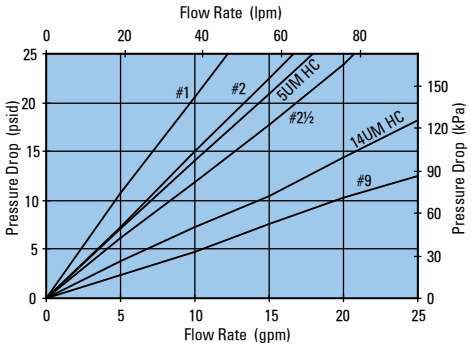
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

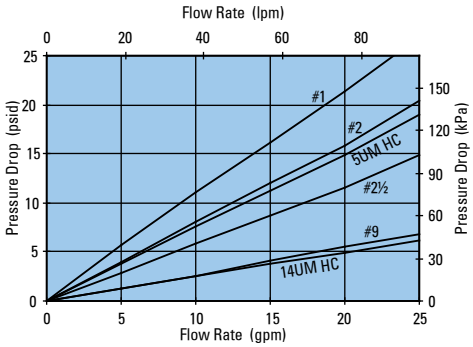
HPK02 Housing Only



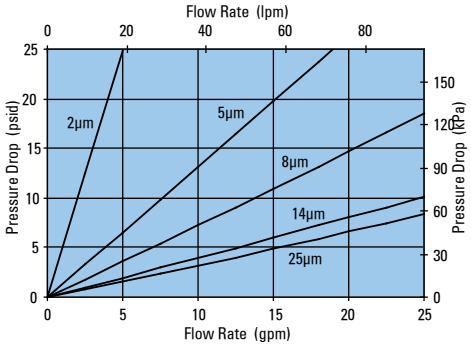
HPK02 Standard 4" Element Only



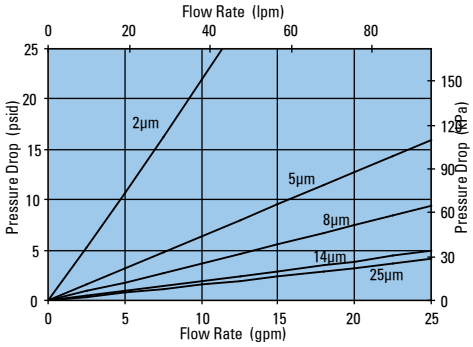
HPK02 Standard 8" Element Only



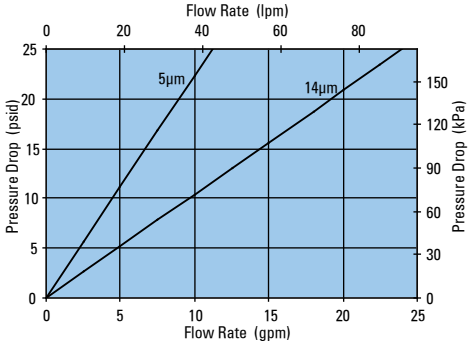
HPK02 DT-9020-4 Element Only



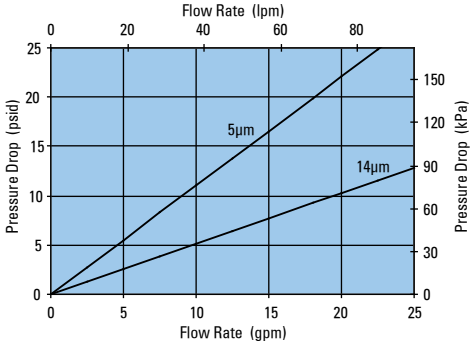
HPK02 DT-9020-8 Element Only



HPK02 DT-9021-4 Element Only

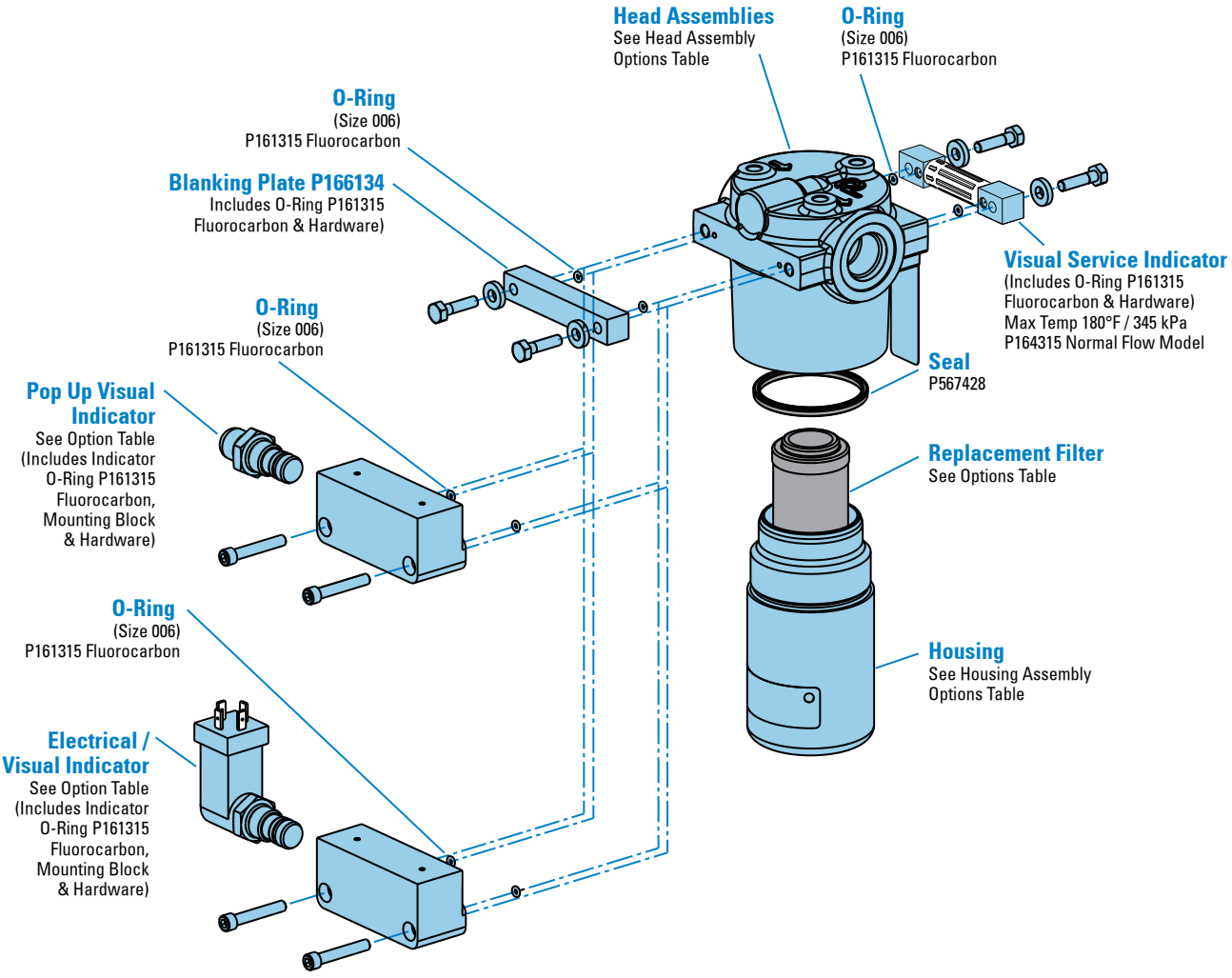


HPK02 DT-9021-8 Element Only



Donaldson

HPK02 Service Parts



Donaldson

W440

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 bowl drain plug helps relieve system pressure during filter change-outs. Donaldson Triboguard™ 4-layer media is offered in a variety of designs. Five different media grades are offered. Donaldson elements 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 the differential indicators.

- Conforms to HF2 specifications
- High collapse element 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 bowl length options for design flexibility
- Head Material: Cast Iron
- Bowl Material: Steel
- Drain plug in bowl

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Manifold Porting Sizes
- Top-ported for subplate mounting 0.69" (17.5 mm) holes, 1.25" (31.8 mm) centers

Housing Weight
- 4": 8.4 lbs / 3.8 kg
- 8": 10.6 lbs / 4.8 kg

Replacement Filter Lengths
- 4.41" / 111.9*mm*
- 4.41" / 111.9*mm*

Standard Bypass Ratings
- No Bypass
- 50 psi / 345 kPa / 3.5 bar
- 90 psi / 621 kPa / 6.2 bar

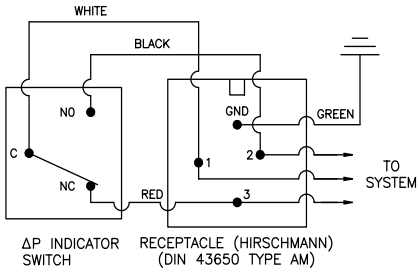
Operating Temperatures
- -20° to 250°F (-29° to 121°C)

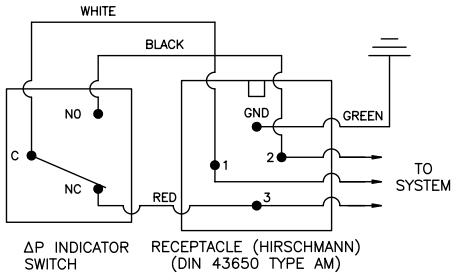
Element Collapse Ratings
- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

Donaldson

Indicator Switch Schematic Wiring Diagram

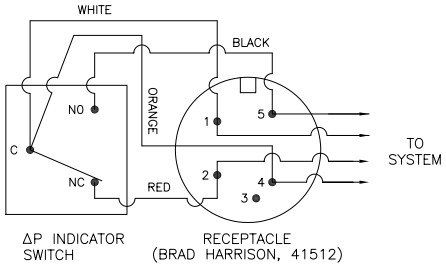
Aluminum Electrical Housings

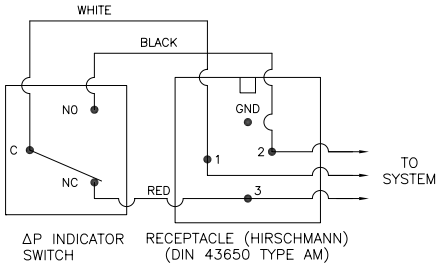




Note: The female plug (connector) is to be furnished by customer.

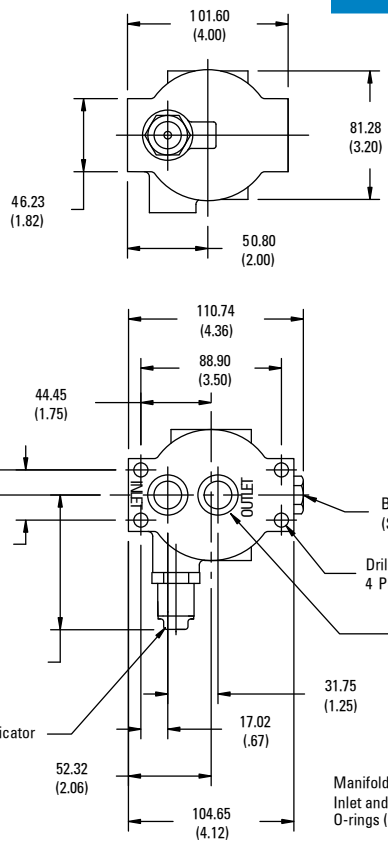
Plastic Electrical Housings



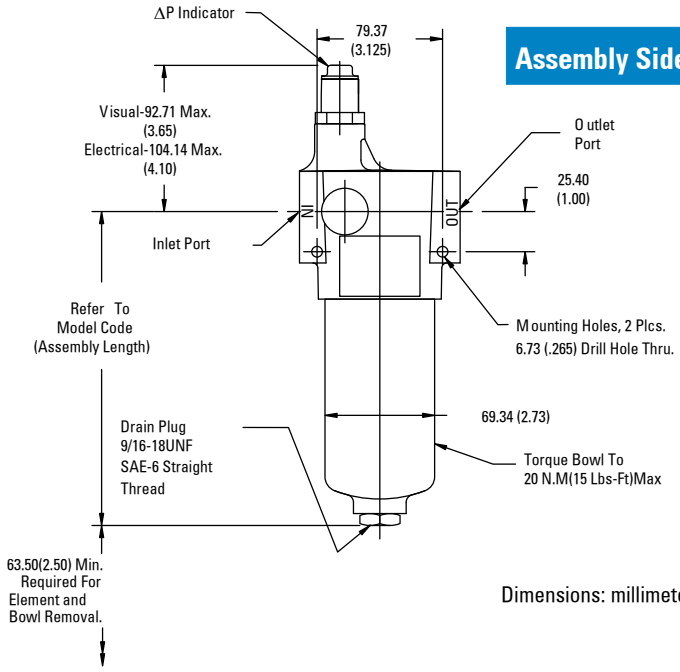


Note: The female plug (connector) is to be furnished by customer.

Head Top View



Assembly Side 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.

Donaldson

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2.5 µm	<4 µm	4/111.9	DT-9020-4-2UM	9020 Series
5 µm	5 µm	4/111.9	DT-9020-4-5UM	9020 Series
8 µm	8 µm	4/111.9	DT-9020-4-8UM	9020 Series
14 µm	14 µm	4/111.9	DT-9020-4-14UM	9020 Series
25 µm	25 µm	4/111.9	DT-9020-4-25UM	9020 Series
2.5 µm	<4 µm	8/210.3	DT-9020-8-2UM	9020 Series
5 µm	5 µm	8/210.3	DT-9020-8-5UM	9020 Series
8 µm	8 µm	8/210.3	DT-9020-8-8UM	9020 Series
14 µm	14 µm	8/210.3	DT-9020-8-14UM	9020 Series
25 µm	25 µm	8/210.3	DT-9020-8-25UM	9020 Series
5 µm	5 µm	4/113.2	DT-9021-4-5UM	9021 Series: High Collapse
14 µm	14 µm	4/113.2	DT-9021-4-14UM	9021 Series: High Collapse
5 µm	5 µm	8/207.2	DT-9021-8-5UM	9021 Series: High Collapse
14 µm	14 µm	8/207.2	DT-9021-8-14□M	9021 Series: High Collapse

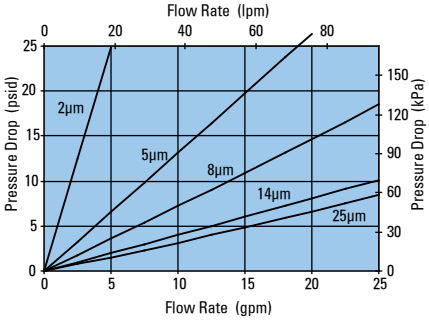
Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum endcaps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

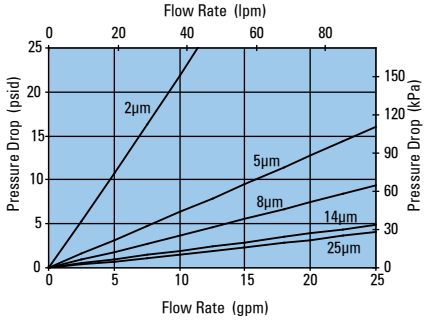
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

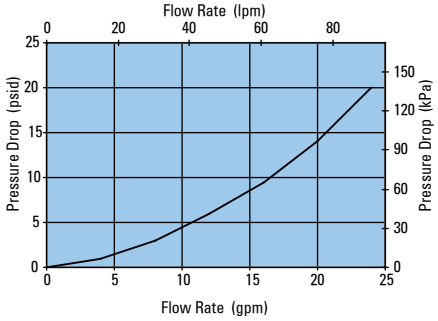
DT-9020-4 Element Only



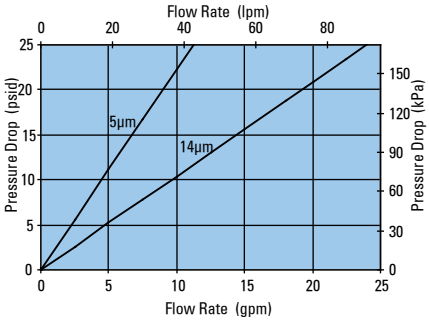
DT-9020-8 Element Only



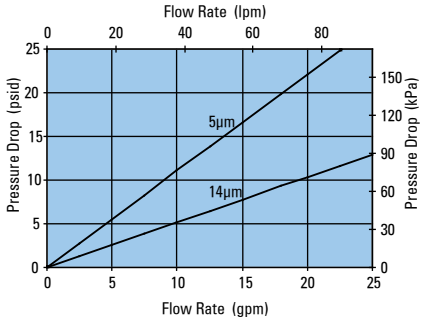
W440 Housing Only



DT-9021-4 Element Only



DT-9021-8 Element Only



Donaldson

Ordering Guide

Filter Assembly	W440	1	S	1	J | N	B	1
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6	TABLE 7
Service Element	Elements ordered separately. See page 96 for element choices.						

Table 1

Filter Assembly / Service Element

CODE	DESCRIPTION
W440	Assembly

Table 2

Element 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	1-1/16" - 12 UN (SAE 12)
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 element.

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
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 & Element Length

CODE (LGTH)	ELEMENT 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

Donaldson

FPK02

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*

Synteq®

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 'n Match system of in-stock heads, housings & cartridges—so you can get exactly what you need. Likewise, 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 liquid filtration. (See page 240 for details on Synteq.)

Beta Rating
- Performance to $ß_{<4(c)}$=1000

T-Type Porting Sizes
- SAE-12 O-Ring Ports (standard)

Assembly Weight
- 4" Assembly: 9.2 lbs / 4.2 kg
- 8" Assembly: 13.2 lbs / 6.0 kg

Replacement Filter Lengths
- 4" / 101.5*mm*
- 8" / 203*mm*

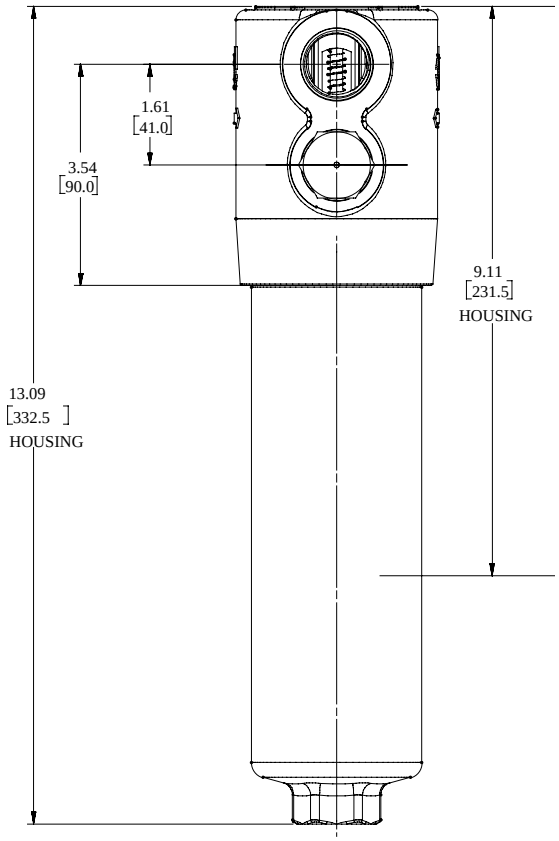
Standard Bypass Ratings
- 87 *psi* / 600 kPa / 6 bar
- 87 *psi* Bypass with reverse-flow check valve
- No Bypass

Operating Temperatures
- -20°F to 250°F / -29°C to 120°C

Element Collapse Ratings
- 290 *psi* / 2000 kPa / 20 bar (standard)
- 3000 *psi* / 20,700 kPa / 207 bar (high collapse)

Donaldson

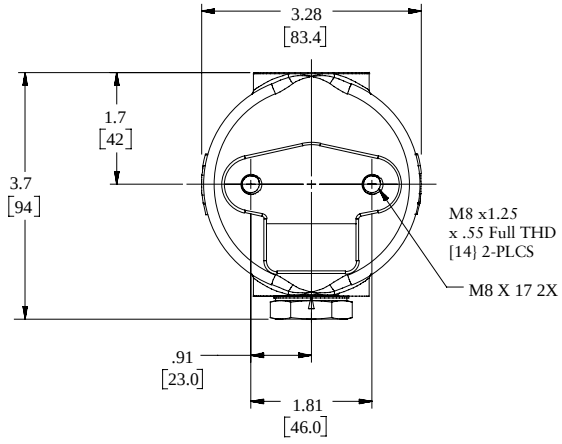
Assembly - Side View



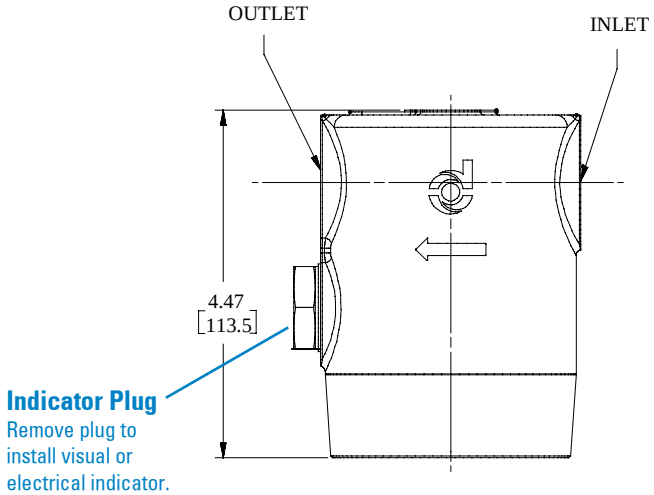
Applications:

Servo Valve Circuits
In-Plant & Mobile Equipment
Power Steering Circuits
High Pressure Circuits
Meets HF2 Specification

Head - Top View



Head - Side View



Indicator Plug
Remove plug to install visual or electrical indicator.

All dimensions above are shown in inches [millimeters]

Donaldson

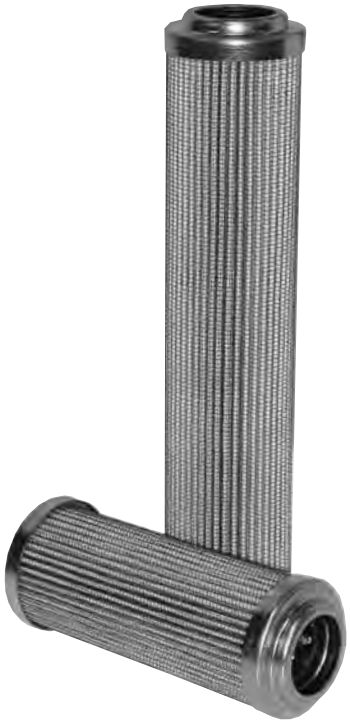
FPK02 Components

Element Choices

Media	$B_{x(c)}$ = 1000	Length	Part	Comments
No. 1	6 µm	4.37/111	P169429	BunaN Seal
			P167180	Fluorocarbon Seal High Collapse
		8.12/203	P167838	BunaN Seal
			P167182	Fluorocarbon Seal High Collapse
No. 2	9 µm	4.37/111	P165041	BunaN Seal
		8.12/203	P165043	BunaN Seal
No. 2½	10 µm	4.37/111	P165006	BunaN Seal
			P167181	Fluorocarbon Seal High Collapse
		8.12/203	P165015	BunaN Seal
			P167183	Fluorocarbon Seal High Collapse
No. 9	23 µm	4.37/111	P165136	BunaN Seal
		8.12/203	P165138	BunaN 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 BunaN 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" elements, with their steel end caps and wire-backed media, are rated to withstand up to 3000 psi/ 20,700 kPa before collapsing.
- The fluorcarbon seal/high collapse elements also use epoxy potting and media seam seals for added chemical compatibility.



Synteq®

All FPK02 filters contain Synteq®, our synthetic media designed for liquid filtration. Find out more on page 240.

Housing Choices

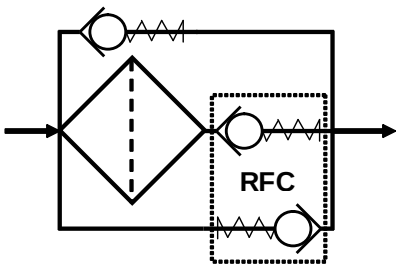
Length (in.)	Part No.
4" element	P762769
8" element	P762770

Head Choices

Port Size[4]	Bypass Rating	Part No.
SAE-12 O-Ring	87 psi / 6 bar	P762766
SAE-12 O-Ring	87 psi / 6 bar with reverse-flow check valve	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 103 for details.

Reverse Flow Check Schematic



Donaldson

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2 µm	<4 µm	4/111.9	DT-9020-4-2UM	9020 Series
5 µm	5 µm	4/111.9	DT-9020-4-5UM	9020 Series
8 µm	8 µm	4/111.9	DT-9020-4-8UM	9020 Series
14 µm	14 µm	4/111.9	DT-9020-4-14UM	9020 Series
25 µm	25 µm	4/111.9	DT-9020-4-25UM	9020 Series
2 µm	<4 µm	8/210.3	DT-9020-8-2UM	9020 Series
5 µm	5 µm	8/210.3	DT-9020-8-5UM	9020 Series
8 µm	8 µm	8/210.3	DT-9020-8-8UM	9020 Series
14 µm	14 µm	8/210.3	DT-9020-8-14UM	9020 Series
25 µm	25 µm	8/210.3	DT-9020-8-25UM	9020 Series
5 µm	5 µm	4/113.2	DT-9021-4-5UM	9021 Series: High Collapse
14 µm	14 µm	4/113.2	DT-9021-4-14UM	9021 Series: High Collapse
5 µm	5 µm	8/207.2	DT-9021-8-5UM	9021 Series: High Collapse
14 µm	14 µm	8/207.2	DT-9021-8-14UM	9021 Series: High Collapse

Filter Notes

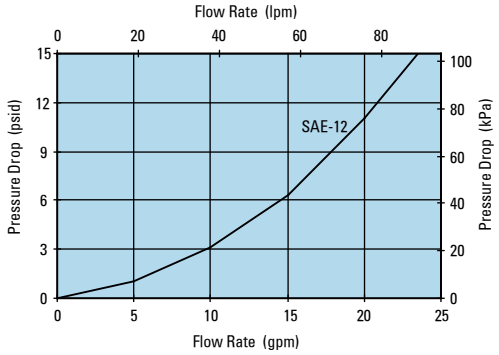
- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements are potted and seam-sealed with epoxy-based adhesives.
- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum end caps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

Donaldson

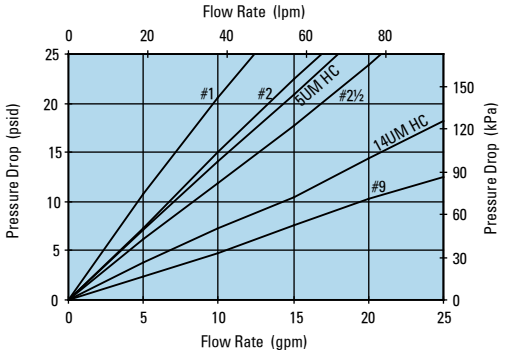
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

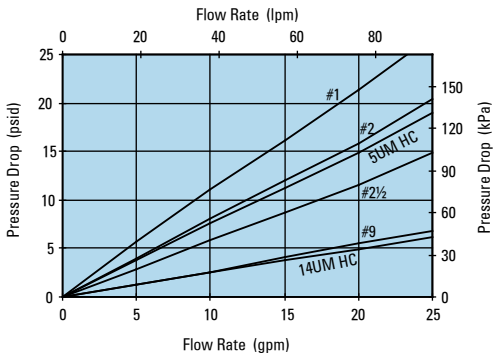
FPK02 Housing Only



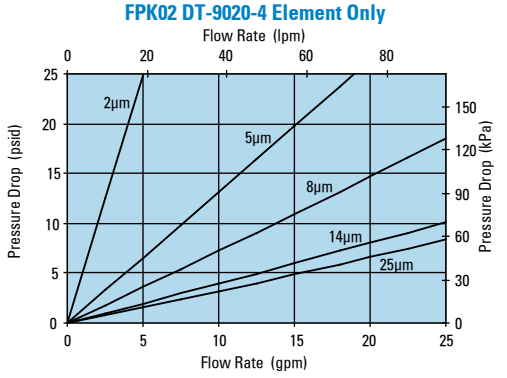
FPK02 Standard 4" Element Only



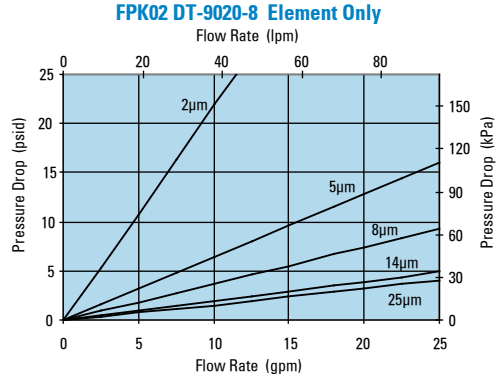
FPK02 Standard 8" Element Only



FPK02 DT-9020-4 Element Only



FPK02 DT-9020-8 Element Only



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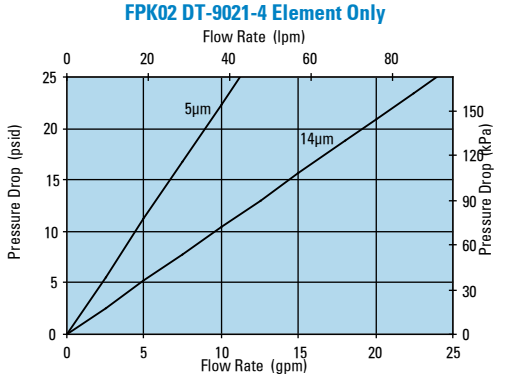

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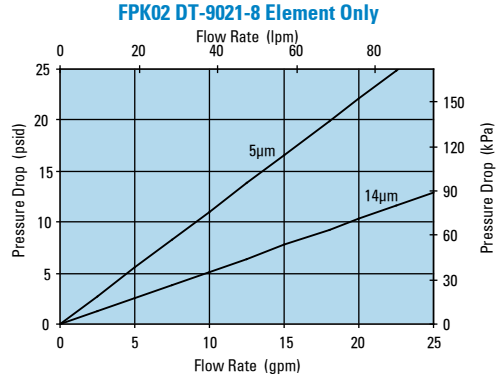
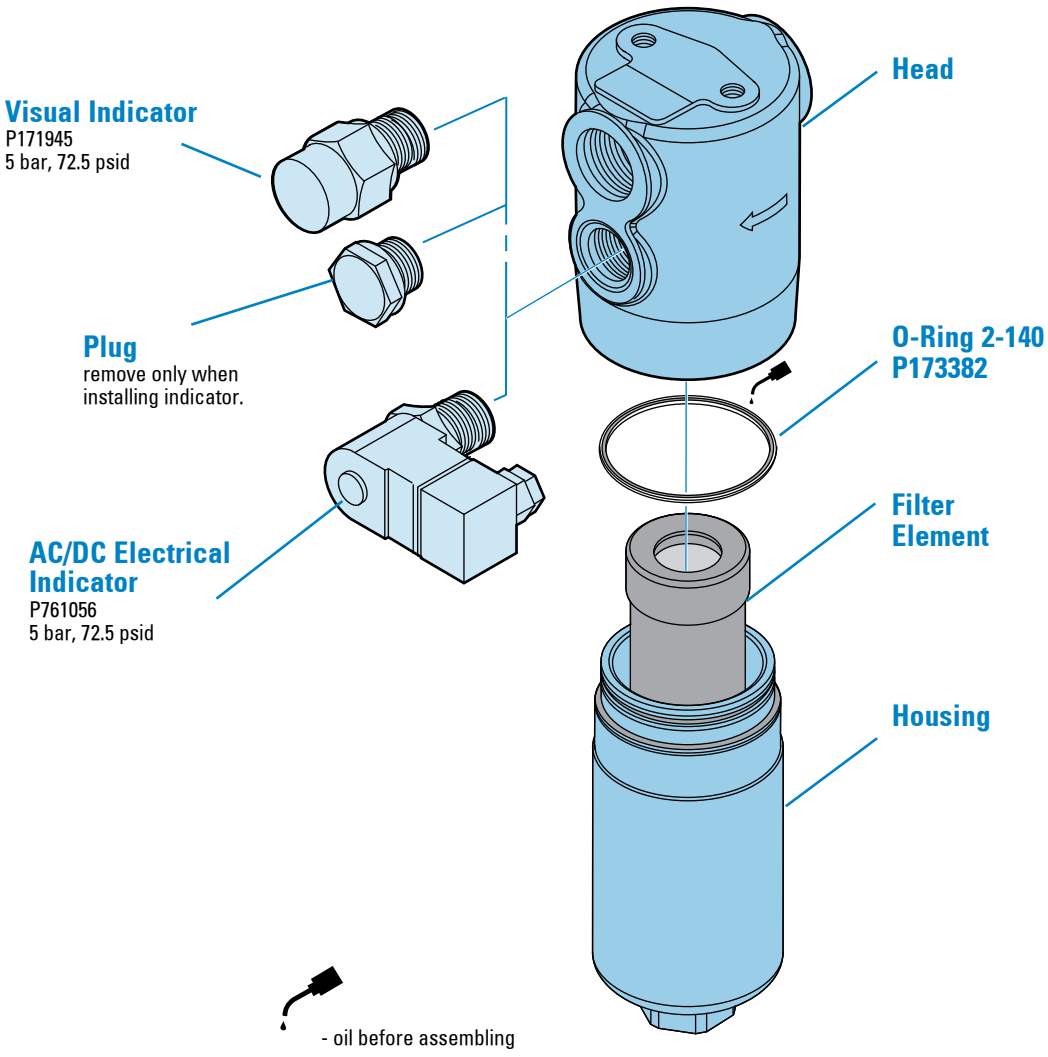


Donaldson

FPK02 Service Parts

When installing the FPK02 housing onto an installed head, torque it to 15 ft-lbs./2.1 kg-m.



Donaldson

W350

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* 189 *lpm*

Synteq

Features

The W350 T-type ported series offers flows to 50 gpm (189 lpm) with 3 bypass options and conforms to the HF3 automotive standard. Our standard bowl drain plug helps relieve system pressure during filter changeouts. Donaldson Triboguard™ 4-layer media is offered in a variety of designs. Five different media grades are offered. Donaldson elements 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 element available for use with non-bypass applications
- Wide range of indicator options
- Two bowl length options for design flexibility
- Head Material: Cast Iron
- Bowl Material: Steel
- Drain plug in bowl
- Bleed plug in head

Beta Rating
- Performance to $ß_{<4(c)}$=1000

Manifold Porting Sizes
- SAE 12 O-Ring
- SAE 16 O-Ring

Housing Weight
- 4": 13 lbs / 5.9 kg
- 8": 15 lbs / 6.8 kg

Replacement Filter Lengths
- 4.59" / 116.7*mm*
- 8.22" / 208.8*mm*

Standard Bypass Ratings
- No Bypass
- 50 psi / 345 kPa / 3.5 bar
- 90 psi / 621 kPa / 6.2 bar

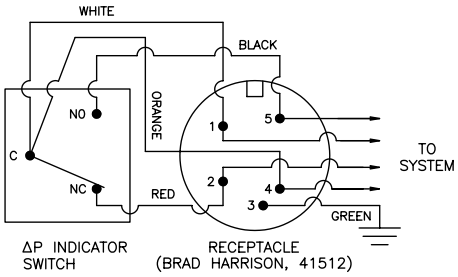
Operating Temperatures
- -20° to 250°F (-29° to 121°C)

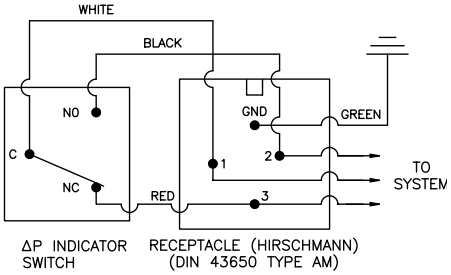
Element Collapse Ratings
- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

Donaldson

Indicator Switch Schematic Wiring Diagram

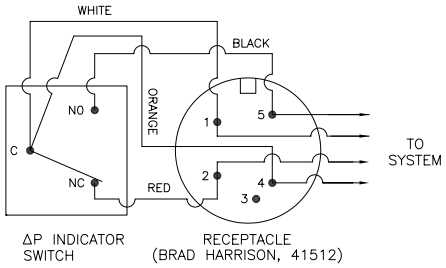
Aluminum Electrical Housings

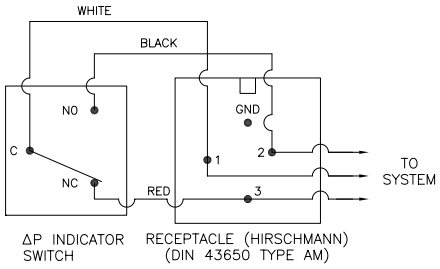




Note: The female plug (connector) is to be furnished by customer.

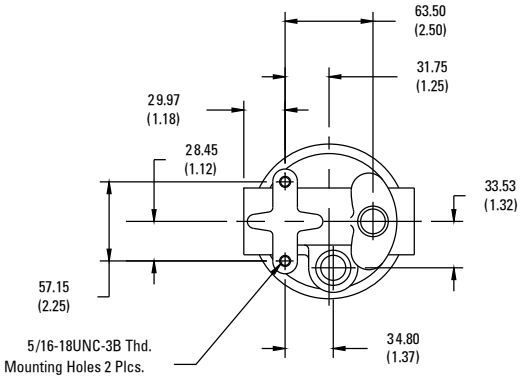
Plastic Electrical Housings



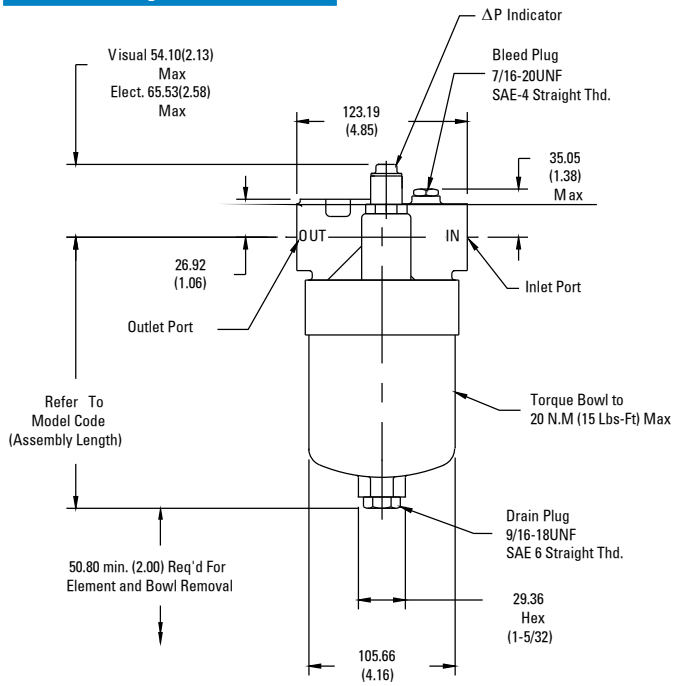


Note: The female plug (connector) is to be furnished by customer.

Head Top View



Assembly Side 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.

Donaldson

W350 Components

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2 µm	<4 µm	4/116.7	DT-9600-4-2UM	9600 Series
5 µm	5 µm	4/116.7	DT-9600-4-5UM	9600 Series
8 µm	8 µm	4/116.7	DT-9600-4-8UM	9600 Series
14 µm	14 µm	4/116.7	DT-9600-4-14UM	9600 Series
25 µm	25 µm	4/116.7	DT-9600-4-25UM	9600 Series
5 µm	5 µm	4/116	DT-9601-4-5UM	9601 Series: High Collapse
14 µm	14 µm	4/116	DT-9601-4-14UM	9601 Series: High Collapse
2 µm	<4 µm	8/208.8	DT-9600-8-2UM	9600 Series
5 µm	5 µm	8/208.8	DT-9600-8-5UM	9600 Series
8 µm	8 µm	8/208.8	DT-9600-8-8UM	9600 Series
14 µm	14 µm	8/208.8	DT-9600-8-14UM	9600 Series
25 µm	25 µm	8/208.8	DT-9600-8-25UM	9600 Series
5 µm	5 µm	8/208	DT-9601-8-5UM	9601 Series: High Collapse
14 µm	14 µm	8/208	DT-9601-8-14UM	9601 Series: High Collapse
2 µm	<4 µm	8/209	DX2-9600-8-2UM	9600 Series: DX2 Non-Metallic Dual Element
5 µm	5 µm	8/209	DX2-9600-8-5UM	9600 Series: DX2 Non-Metallic Dual Element
8 µm	8 µm	8/209	DX2-9600-8-8UM	9600 Series: DX2 Non-Metallic Dual Element
14 µm	14 µm	8/209	DX2-9600-8-14UM	9600 Series: DX2 Non-Metallic Dual Element
WA	B>30$_{(c)}$ = 200	8/209	P569528	Absorbs 130 ml water @ 25 psid

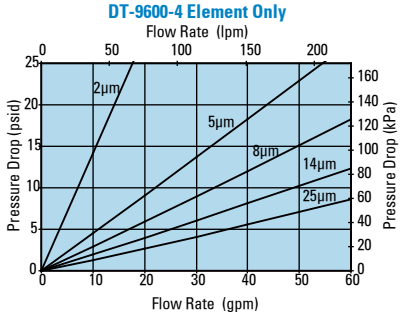
Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum endcaps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

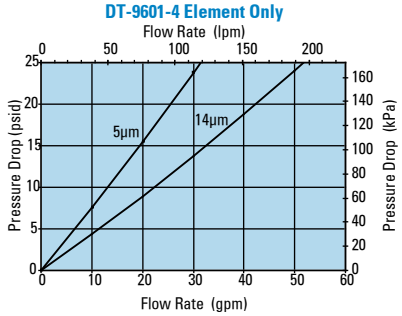
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

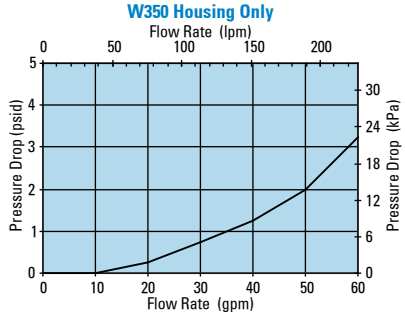
DT-9600-4 Element Only



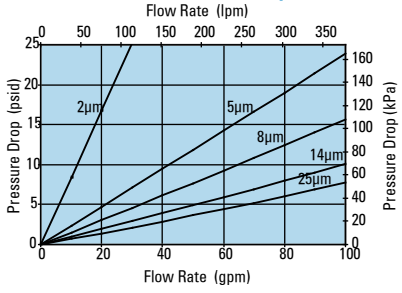
DT-9601-4 Element Only



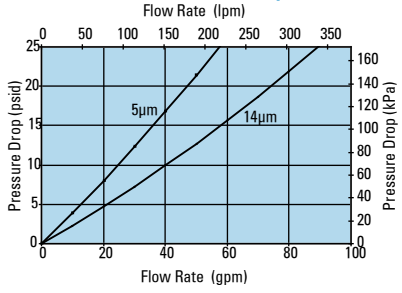
W350 Housing Only



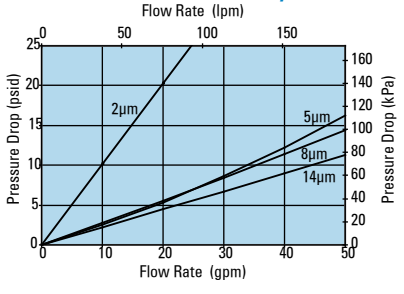
DT-9600-8 Element Only



DT-9601-8 Element Only



DX2-9600-8 Element Only



Donaldson.

Ordering Guide

Filter Assembly	W350	1	B	1	J | N	B	1
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6	TABLE 7
Service Element	Elements ordered separately. See page 106 for element choices.						

Table 1

Filter Assembly / Service Element	
CODE	DESCRIPTION
W350	Assembly

Table 2

Element 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	1-1/16" - 12 UN (SAE12)
B	1-5/16" - 12 UN (SAE 16)

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 element.

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	DP 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
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
E	E.P.R.
V	Viton

Table 7

Assembly & Element Length	
CODE (LENGTH)	ELEMENT LENGTH
1 (8.5")	4.0"
2 (12.0")	8.0"

Metric Porting Available
Change W350 to G350
Porting code A becomes G-3/4" ISO 228 BSPP
Porting code B becomes G-1" ISO 228 BSPP

Donaldson

HPK03

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*

Synteq®

Features

The sturdy HPK03 filter is constructed of ductile iron for durability in high pressure applications. Standard bowl drain plug means simplified servicing. Bowl includes a fluoroelastomer head-to-housing seal. Meets HF3 specification.

Take advantage of our Mix 'n 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 BunaN are available with HPK03.

All HPK03 filters contain Synteq®, our synthetic filter media designed especially for liquid filtration.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

T-Type Porting Sizes
- SAE-12 O-Ring
- SAE-16 O-Ring

Assembly Weight
- 26 lbs / 11.8 kg

Replacement Filter Lengths
- 8" / 203*mm*

Standard Bypass Ratings
- 50 *psi* / 345 kPa / 3.5 bar
- No Bypass

Operating Temperatures
- -20°F to 250°F / -29°C to 121°C

Element Collapse Ratings
- 200 *psi* / 1380 kPa / 13.8 bar (standard)
- 3000 *psi* / 20,700 kPa / 206.9 bar (high collapse)

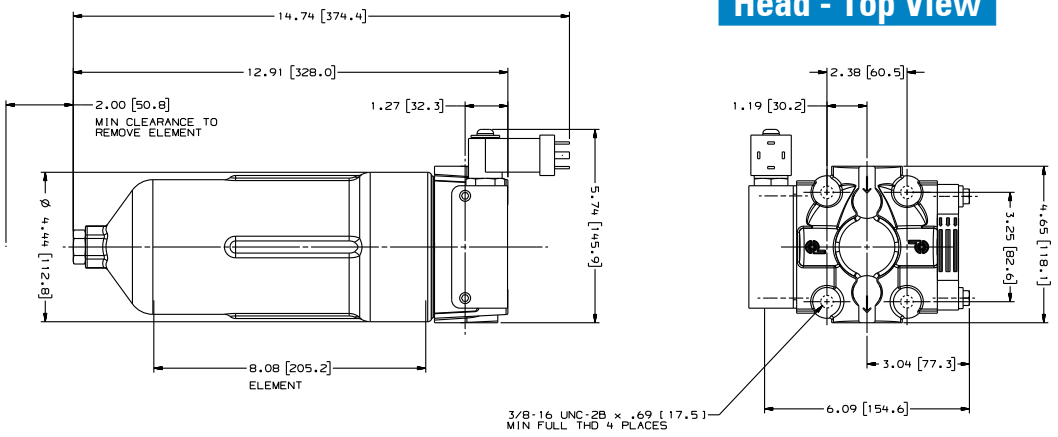
Donaldson

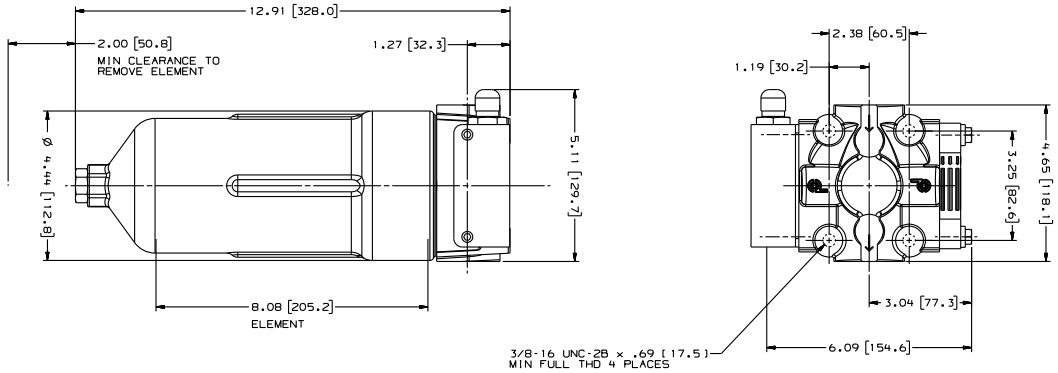
Assembly - Side View

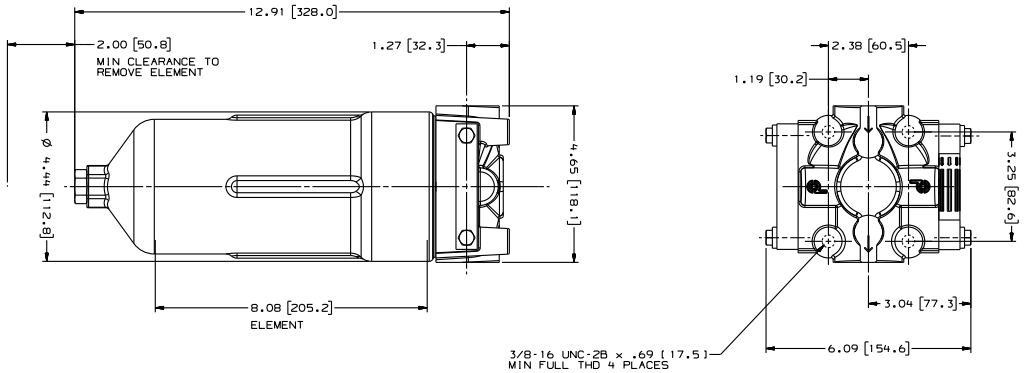
Applications:

- High Pressure Circuits
- In-Plant & Mobile Equipment
- Servo Valve Circuits
- Meets HF3 specifications

Head - Top View







All dimensions above are shown in inches [millimeters]

Donaldson

HPK03 Components

Element Choices

Media Number	$B_{x(c)}$ = 1000 Rating	Part No.	Comments
No. 1	6 µm	P167842	BunaN
No. 1	6 µm	P167185	Viton High Collapse for No Bypass applications.
No. 2	9 µm	P164594	BunaN
No. 2	9 µm	P164601	Viton
No. 2½	10 µm	P164166	BunaN
No. 2½	10 µm	P167186	Viton High Collapse for No Bypass applications.
No. 4	20 µm	P164365	Viton
No. 9	23 µm	P164174	BunaN
No. 20	>50 µm	P165319	BunaN
WA	$B>30_{(c)}$ = 200	P569528	BunaN Absorbs 130 ml water @ 25 psid
No. 74	75 µm nominal	P162233	BunaN Seal Wire Mesh Media

Filter Notes

- SEALS: Filters with seals made of BunaN 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. (Viton is a registered trademark of DuPont Dow Elastomers.)
- 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 element versions also use epoxy potting and media seam seals for added chemical compatibility.

Synteq®

All HPK03 filters contain Synteq®, our synthetic media specially-developed for liquid filtration. Find out more on page 240.

Housing

The **P179579** housing is 10.73 inches (273mm) long and accepts the filter element that is 8 inches (203mm) long. It includes a head-to-housing seal.

Housing Choices

Length (in.)	Part No.
8" element	P179579

Head Choices

Port Size	Bypass Rating	Indicators[1]	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

1 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.

Donaldson

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2 µm	<4 µm	8/208.8	DT-9600-8-2UM	9600 Series
5 µm	5 µm	8/208.8	DT-9600-8-5UM	9600 Series
8 µm	8 µm	8/208.8	DT-9600-8-8UM	9600 Series
14 µm	14 µm	8/208.8	DT-9600-8-14UM	9600 Series
25 µm	25 µm	8/208.8	DT-9600-8-25UM	9600 Series
5 µm	5 µm	8/208	DT-9601-8-5UM	9601 Series: High Collapse
14 µm	14 µm	8/208	DT-9601-8-14UM	9601 Series: High Collapse
2 µm	<4 µm	8/209	DX2-9600-8-2UM	9600 Series: DX2 Non-Metallic Dual Element
5 µm	5 µm	8/209	DX2-9600-8-5UM	9600 Series: DX2 Non-Metallic Dual Element
8 µm	8 µm	8/209	DX2-9600-8-8UM	9600 Series: DX2 Non-Metallic Dual Element
14 µm	14 µm	8/209	DX2-9600-8-14UM	9600 Series: DX2 Non-Metallic Dual Element

Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum endcaps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

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

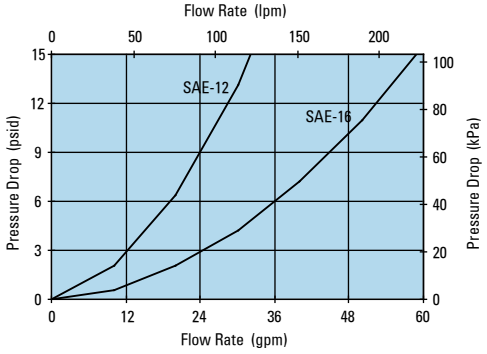
Part No.	Description
P567458	Visual/Electrical indicator with thermal lockout and surge, 35 psid/2.4 bar
P567459	Visual/Electrical indicator, with thermal lockout and surge 70 psid/4.8 bar
P567456	Pop-Up Visual Indicator, with thermal lockout and surge 35 psid/2.4 bar
P567457	Pop-Up Visual Indicator, 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

Donaldson

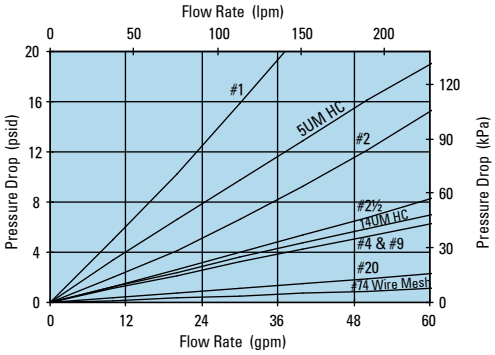
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

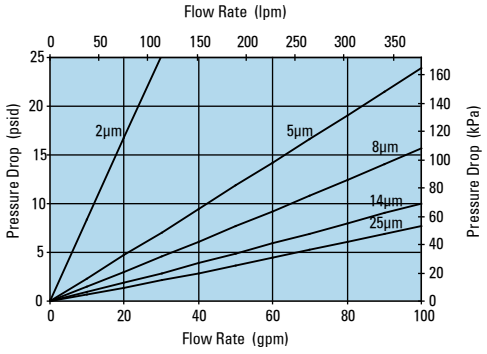
HPK03 Housing Only



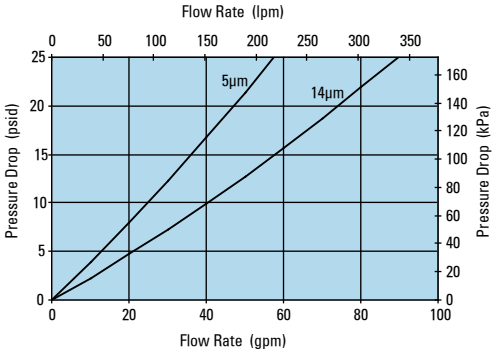
HPK03 8" Standard Filter Only



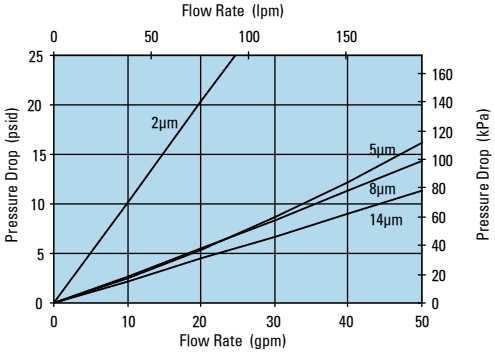
DT-9600-8 Element Only



DT-9601-8 Element Only

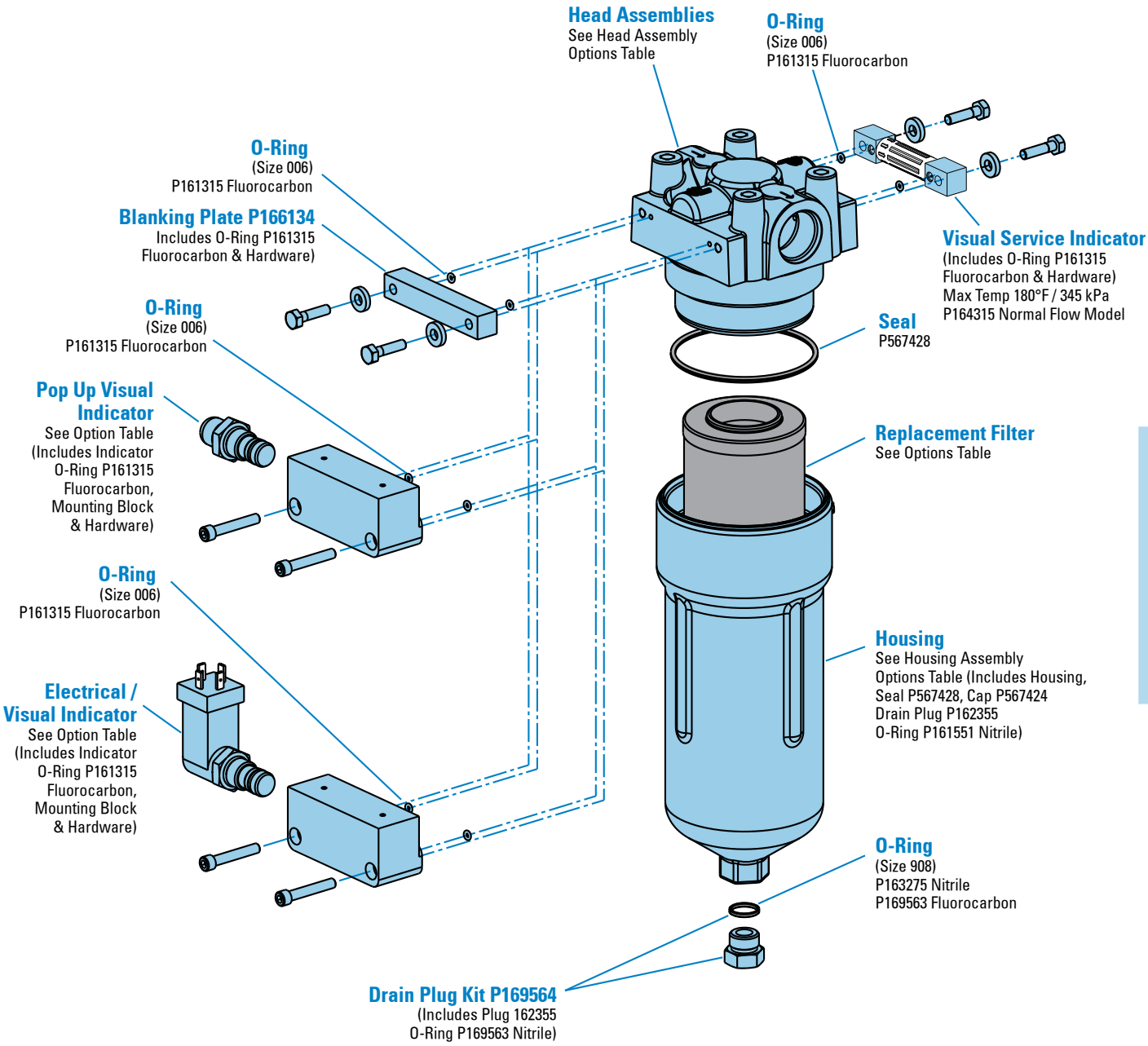


DX2-9600-8 Element Only



Donaldson

HPK03 Service Parts



Donaldson

FPK04

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*

Synteq®

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 Triboguard elements 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 elements available for use with non-bypass applications
- Wide range of indicator options
- Three bowl length options for design flexibility
- Buna N seals standard, Viton available
- Head Material: Cast Iron
- Bowl Material: Steel

Beta Rating
- Performance to $ß_{<4(c)}$=1000

T-Type Porting Sizes
- SAE-20 O-Ring Ports (standard)

Housing Weight
- 4": 26.4 lbs / 12.0 kg
- 8": 33 lbs / 15.0 kg
- 13": 33 lbs / 15.0 kg

Replacement Filter Lengths
- 4.59" / 116.7*mm*
- 8.22" / 208.8*mm*
- 12.91" / 327.8*mm*

Standard Bypass Ratings
- No Bypass
- 87 psi / 600 kPa / 6.0 bar

Operating Temperatures
- -4° to 248°F (-20° to 120°C)

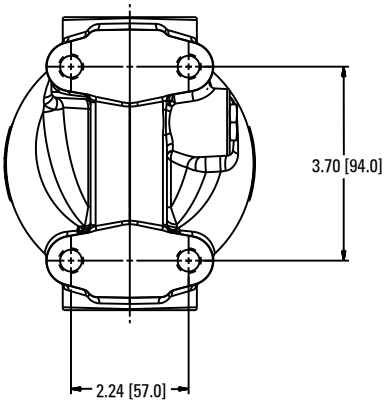
Element Collapse Ratings
- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

Donaldson

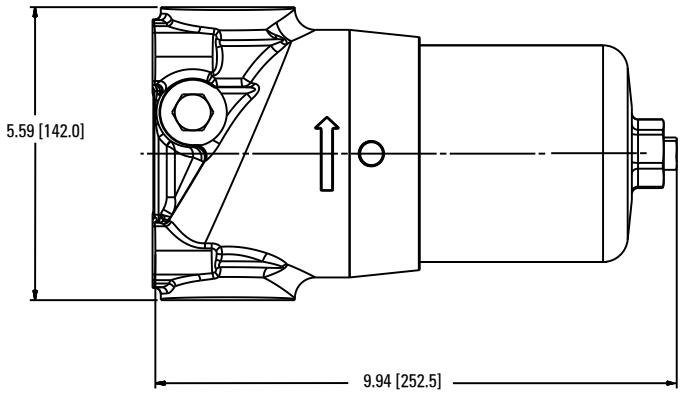
Applications:

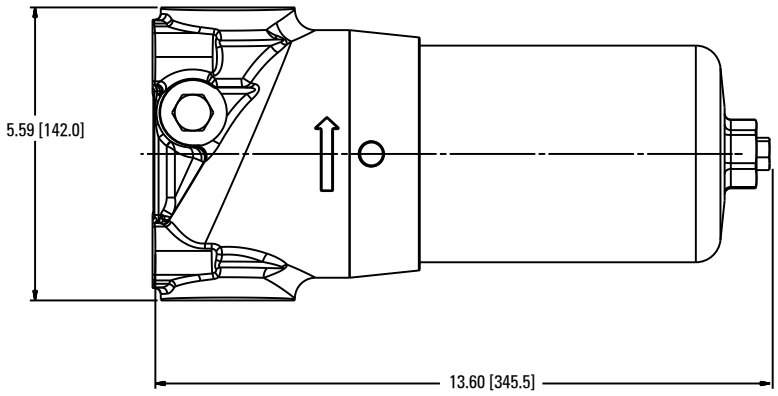
High Pressure Circuits
In-Plant & Mobile Equipment
Servo Valve Circuits

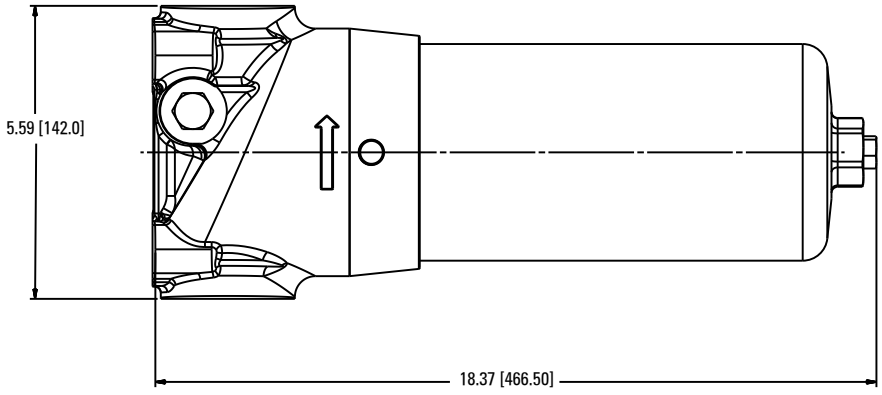
Head - Top View



Assembly - Side View







All dimensions above are shown in inches [millimeters]

Donaldson

FPK04 Components

Donaldson Element Choices

Media Number	Beta$_{x(c)}$=1000 Rating	Part No.	Length (in./mm)	Series	Comments
No. 1	6 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. 4	20 µm	P164364	4.62/117.3	9600	Viton
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
No. 2	9 µm	P164601	8.20/208.3	9600	Viton
14 UM	14 µm	P167186	8.20/208.3	9601	Viton, High collapse
No. 4	20 µm	P164365	8.20/208.3	9600	Viton
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	6 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	20 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

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

Element 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.

Donaldson

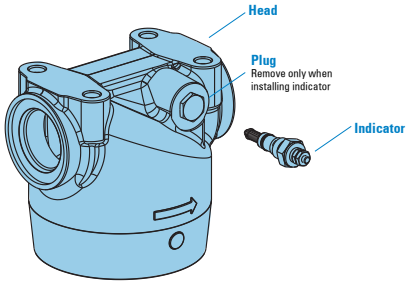
Donaldson Triboguard Element Choices - Upgraded Performance

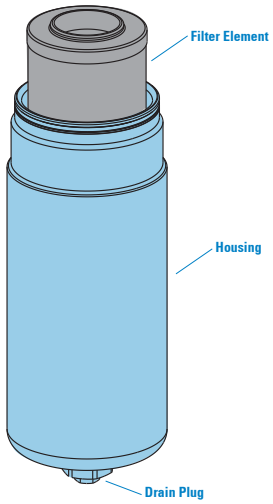
Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2 µm	<4 µm	4/116.7	DT-9600-4-2UM	9600 Series
5 µm	5 µm	4/116.7	DT-9600-4-5UM	9600 Series
8 µm	8 µm	4/116.7	DT-9600-4-8UM	9600 Series
14 µm	14 µm	4/116.7	DT-9600-4-14UM	9600 Series
25 µm	25 µm	4/116.7	DT-9600-4-25UM	9600 Series
5 µm	5 µm	4/116	DT-9601-4-5UM	9601 Series: High Collapse
14 µm	14 µm	4/116	DT-9601-4-14UM	9601 Series: High Collapse
2 µm	<4 µm	8/208.8	DT-9600-8-2UM	9600 Series
5 µm	5 µm	8/208.8	DT-9600-8-5UM	9600 Series
8 µm	8 µm	8/208.8	DT-9600-8-8UM	9600 Series
14 µm	14 µm	8/208.8	DT-9600-8-14UM	9600 Series
25 µm	25 µm	8/208.8	DT-9600-8-25UM	9600 Series
5 µm	5 µm	8/208	DT-9601-8-5UM	9601 Series: High Collapse
14 µm	14 µm	8/208	DT-9601-8-14UM	9601 Series: High Collapse
5 µm	5 µm	8/209	DX2-9600-8-5UM	9600 Series: DX2 Non-Metallic Dual Element
8 µm	8 µm	8/209	DX2-9600-8-8UM	9600 Series: DX2 Non-Metallic Dual Element
14 µm	14 µm	8/209	DX2-9600-8-14UM	9600 Series: DX2 Non-Metallic Dual Element
2 µm	<4 µm	13/327.8	DT-9600-13-2UM	9600 Series
5 µm	5 µm	13/327.8	DT-9600-13-5UM	9600 Series
8 µm	8 µm	13/327.8	DT-9600-13-8UM	9600 Series
14 µm	14 µm	13/327.8	DT-9600-13-14UM	9600 Series
25 µm	25 µm	13/327.8	DT-9600-13-25UM	9600 Series
5 µm	5 µm	13/326.3	DT-9601-13-5UM	9601 Series: High Collapse
14 µm	14 µm	13/326.3	DT-9601-13-14UM	9601 Series: High Collapse
5 µm	5 µm	13/327	DX2-9600-13-5UM	DX2 Non-Metallic Core Dual Element
8 µm	8 µm	13/327	DX2-9600-13-8UM	DX2 Non-Metallic Core Dual Element
14 µm	14 µm	13/327	DX2-9600-13-14UM	DX2 Non-Metallic Core Dual Element

Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum end caps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

FPK04 Service Parts



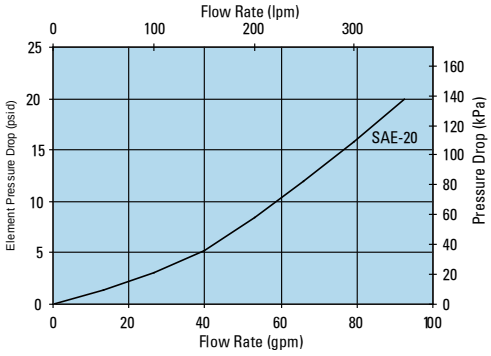


Donaldson

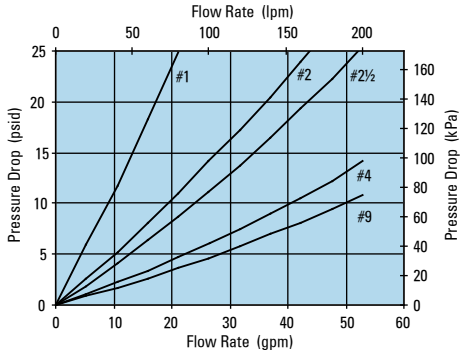
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

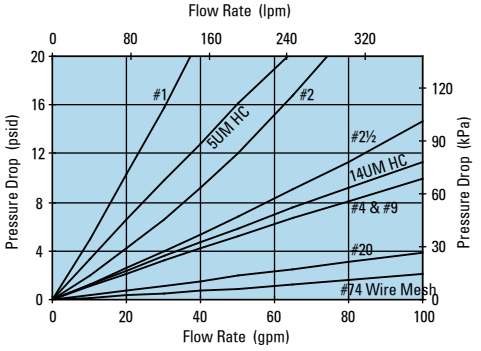
FPK04 Housing Only



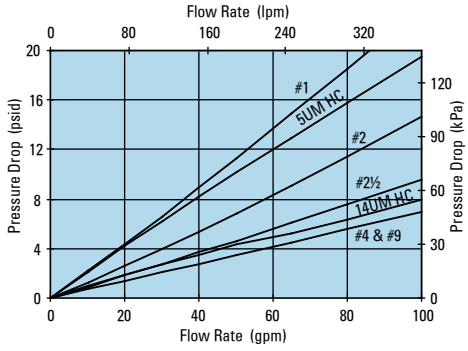
FPK04-4" Standard Element Only



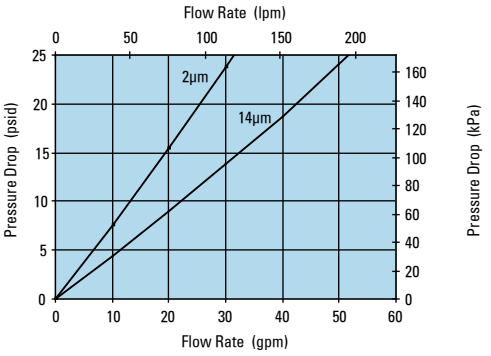
FPK04 8" Standard Element Only



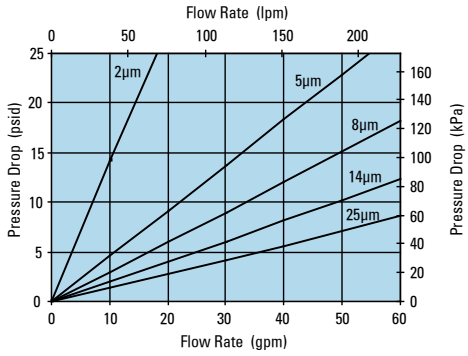
FPK04 13" Standard Element Only



FPK04 DT-9601-4 Element Only



FPK04 DT-9600-4 Element Only

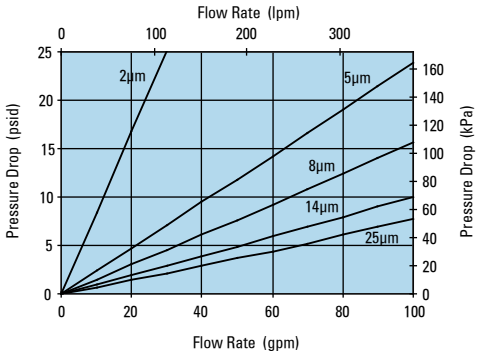


Donaldson.

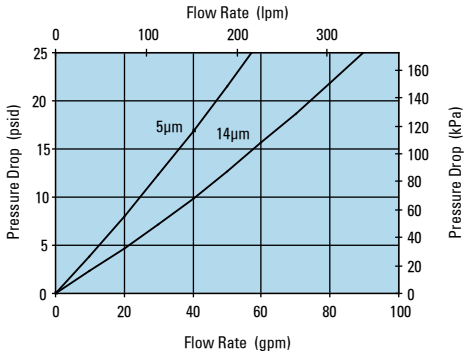
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

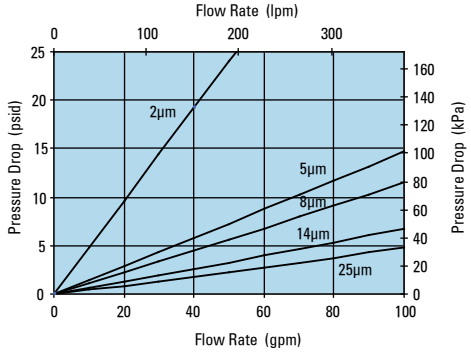
FPK04 DT-9600-8 Element Only



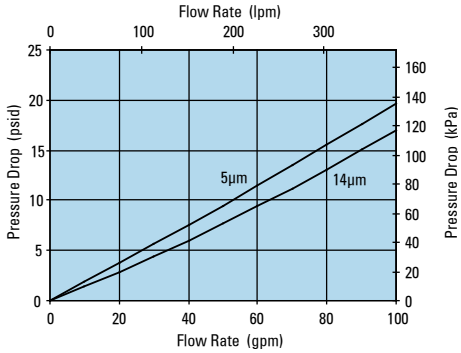
FPK04 DT-9601-8 Element Only



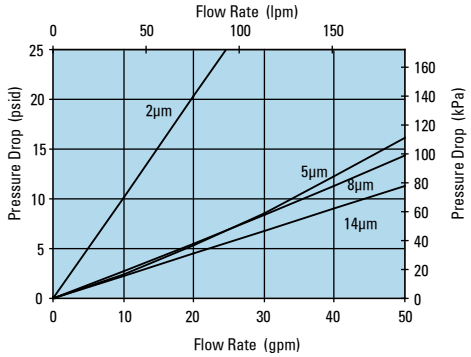
FPK04 DT-9600-13 Element Only



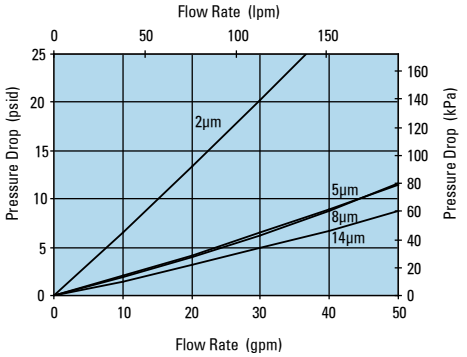
FPK04 DT-9601-13 Element Only



DX2-9600-8 Element Only



DX2-9600-13 Element Only



Donaldson

HPK04

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*

Synteq®

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 bowl drain plug. Meets HF3 specification.

Take advantage of our Mix 'n Match system of in-stock heads, housings & 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.

Beta Rating
- Performance to $ß_{<4(c)}$=1000

T-Type Porting Sizes
- SAE-20 O-Ring
- 1¼" & 1½" SAE 4-Bolt Flange (codes 61, 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" / 203*mm*
- 13" / 328*mm*
- 16" / 406*mm*

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

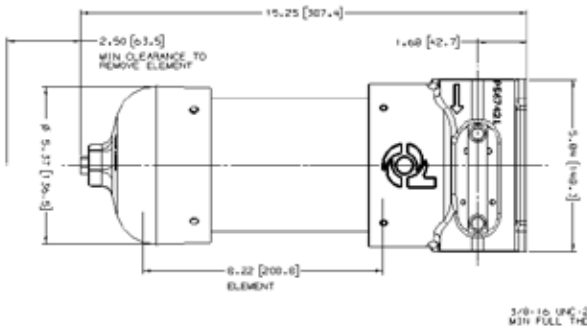
Element Collapse Ratings
- 200 *psi* / 1380 kPa / 13.8 bar (standard)
- 3000 *psi* / 20,700 kPa / 206.9 bar (high collapse)

Donaldson

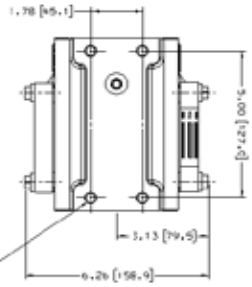
Applications:

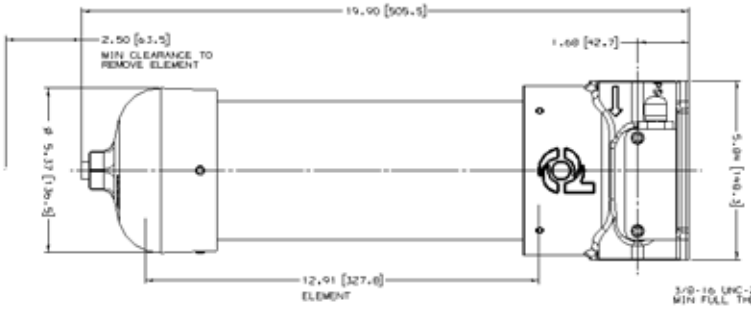
High Pressure Circuits
Hydrostatic Transmissions
Servo Valve Circuits
Meets HF3 Specifications

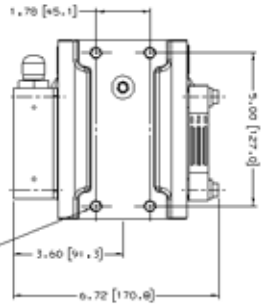
Assembly - Side View

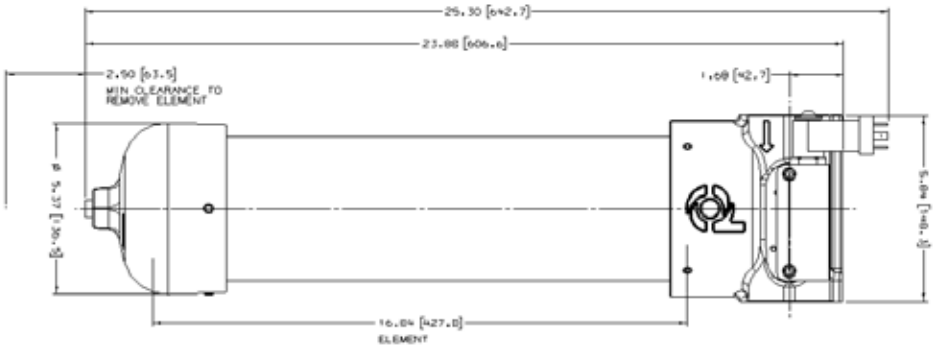


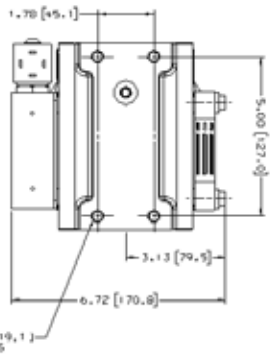
Head - Top View



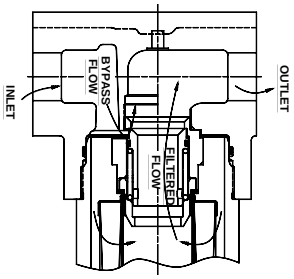




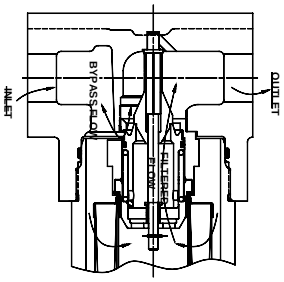




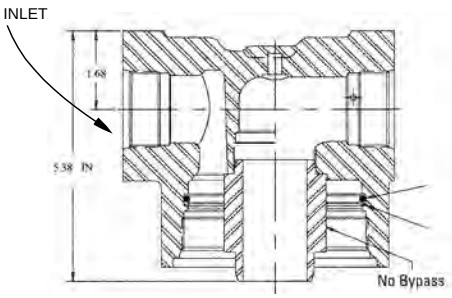
Bypass Valve Alternatives



60 psi / 414 kPa Bypass Valve



90 psi / 621 kPa Bypass Valve with Reverse Flow Check Valve



No Bypass

All dimensions above are shown in inches [millimeters]

Donaldson

HPK04 Components

Donaldson Element Choices

Media Number	Beta$_{x(c)}$=1000 Rating	Part No.	Length (in./mm)	Series	Comments
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
No. 2	9 µm	P164601	8.20/208.3	9600	Viton
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. 4	20 µm	P164365	8.20/208.3	9600	Viton
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	6 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	20 µm	P166255	12.93/328.4	9600	Viton
No. 9	23 µm	P164176	12.93/328.4	9600	Buna N
No. 1	6 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. 2	9 µm	P164603	16.84/427.7	9600	Viton
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$_{(c)}$ = 200	P569528	8.20/208.3	9600	Absorbs 180 ml water @ 25 psid
WA	B>30$_{(c)}$ = 200	P569529	12.93/328.4	9600	Absorbs 220 ml water @ 25 psid
WA	B>30$_{(c)}$ = 200	P569530	16.83/427.5	9600	Absorbs 300 ml water @ 25 psid

Filter Notes

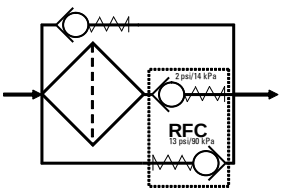
- SEALS: Filters with seals made of **BunaN** are appropriate for most applications involving petroleum oil. Filters with seals made of **Viton**® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F. (Viton is a registered trademark of DuPont Dow Elastomers.)
- The Viton seal, high collapse elements 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.

Housing Choices

Length (in./mm)	Part No.
8/203	P567650
13/330	P567649
16/406	P567648

Head assemblies include head to housing seal.

Reverse Flow Check Schematic



Head Choices

Port Size	Working Pressure	Bypass Rating	Indicators[1]	Part No.
1½" SAE 4-Bolt (Code 61) with SAE-20 O-Ring	3000 psi/207 bar	5 8.20/208.3si/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

[1] 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.

Donaldson

HPK04 Components

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2 µm	<4 µm	8/208.8	DT-9600-8-2UM	9600 Series
5 µm	5 µm	8/208.8	DT-9600-8-5UM	9600 Series
8 µm	8 µm	8/208.8	DT-9600-8-8UM	9600 Series
14 µm	14 µm	8/208.8	DT-9600-8-14UM	9600 Series
25 µm	25 µm	8/208.8	DT-9600-8-25UM	9600 Series
2 µm	<4 µm	13/327.8	DT-9600-13-2UM	9600 Series
5 µm	5 µm	13/327.8	DT-9600-13-5UM	9600 Series
8 µm	8 µm	13/327.8	DT-9600-13-8UM	9600 Series
14 µm	14 µm	13/327.8	DT-9600-13-14UM	9600 Series
25 µm	25 µm	13/327.8	DT-9600-13-25UM	9600 Series
2 µm	<4 µm	16/427.8	DT-9600-16-2UM	9600 Series
5 µm	5 µm	16/427.8	DT-9600-16-5UM	9600 Series
8 µm	8 µm	16/427.8	DT-9600-16-8UM	9600 Series
14 µm	14 µm	16/427.8	DT-9600-16-14UM	9600 Series
25 µm	25 µm	16/427.8	DT-9600-16-25UM	9600 Series
5 µm	5 µm	8/208	DT-9601-8-5UM	9601 Series: High Collapse
14 µm	14 µm	8/208	DT-9601-8-14UM	9601 Series: High Collapse
5 µm	5 µm	13/326.3	DT-9601-13-5UM	9601 Series: High Collapse
14 µm	14 µm	13/326.3	DT-9601-13-14UM	9601 Series: High Collapse
5 µm	5 µm	16/427.1	DT-9601-16-5UM	9601 Series: High Collapse
14 µm	14 µm	16/427.1	DT-9601-16-14UM	9601 Series: High Collapse
5 µm	5 µm	8/209	DX2-9600-8-5UM	9600 Series: DX2 Non-Metallic Dual Element
8 µm	8 µm	8/209	DX2-9600-8-8UM	9600 Series: DX2 Non-Metallic Dual Element
14 µm	14 µm	8/209	DX2-9600-8-14UM	9600 Series: DX2 Non-Metallic Dual Element
5 µm	5 µm	13/327	DX2-9600-13-5UM	9600 Series: DX2 Non-Metallic Dual Element
8 µm	8 µm	13/327	DX2-9600-13-8UM	9600 Series: DX2 Non-Metallic Dual Element
14 µm	14 µm	13/327	DX2-9600-13-14UM	9600 Series: DX2 Non-Metallic Dual Element
5 µm	5 µm	16/427	DX2-9600-16-5UM	9600 Series: DX2 Non-Metallic Dual Element
8 µm	8 µm	16/427	DX2-9600-16-8UM	9600 Series: DX2 Non-Metallic Dual Element
14 µm	14 µm	16/427	DX2-9600-16-14UM	9600 Series: DX2 Non-Metallic Dual Element

Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum end caps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

Donaldson

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.

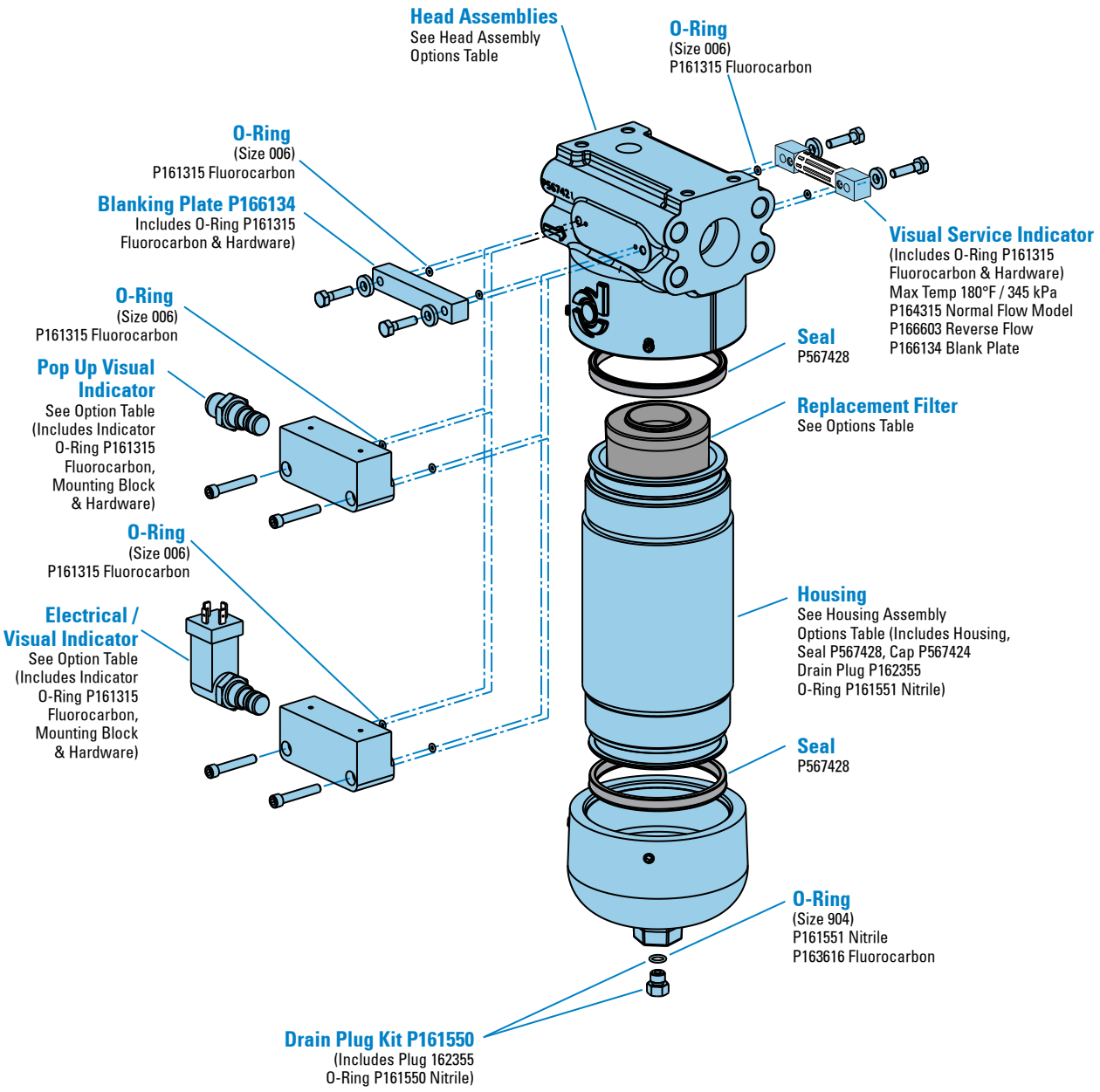
Indicator Service Parts

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

Donaldson

HPK04 Service Parts

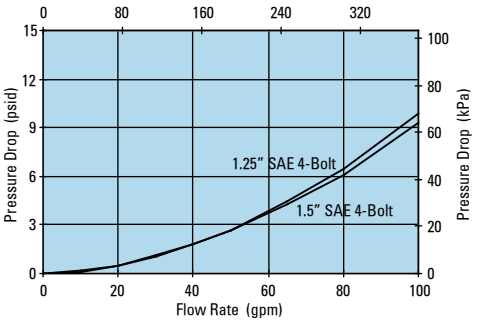


Donaldson

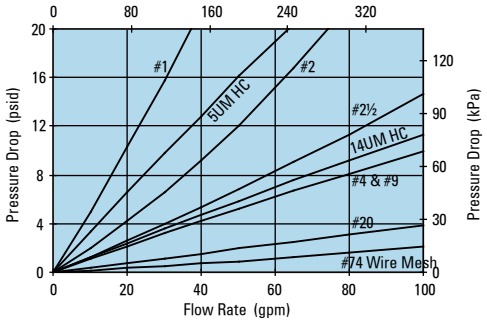
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

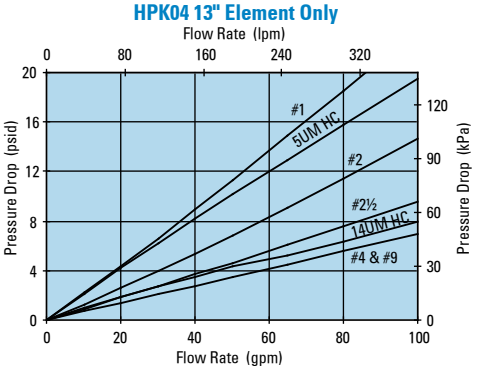
HPK04 Housing Only



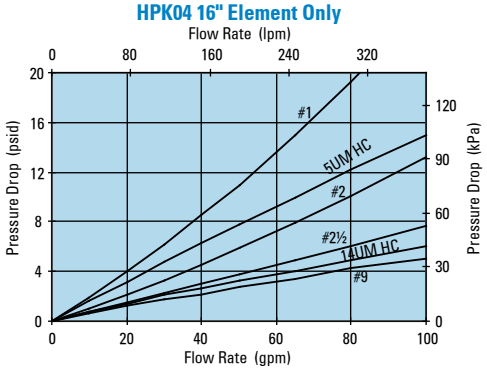
HPK04 8" Element Only



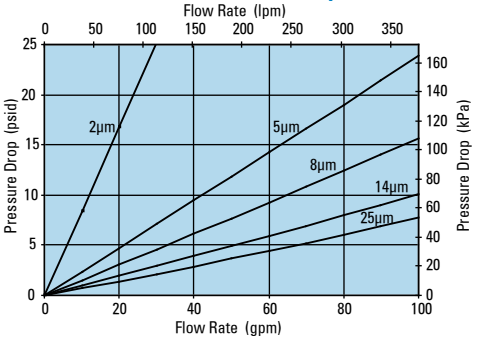
HPK04 13" Element Only



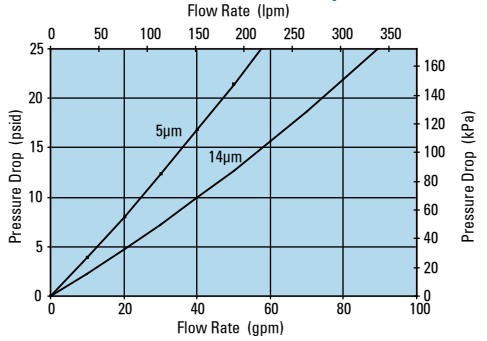
HPK04 16" Element Only



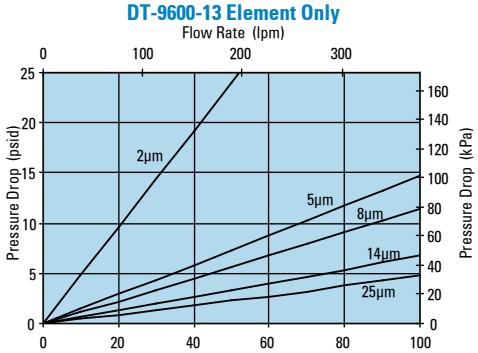
DT-9600-8 Element Only



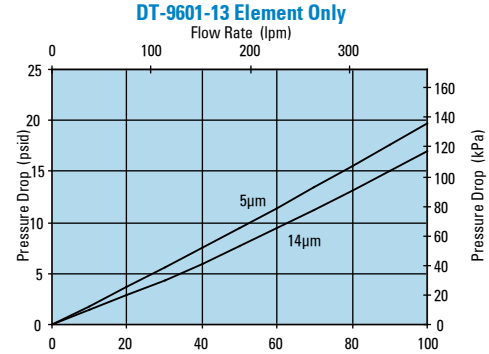
DT-9601-8 Element Only



DT-9600-13 Element Only



DT-9601-13 Element Only

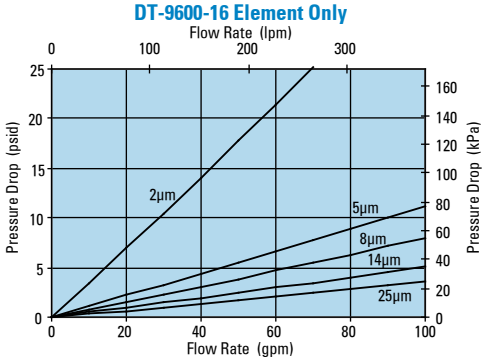


Donaldson

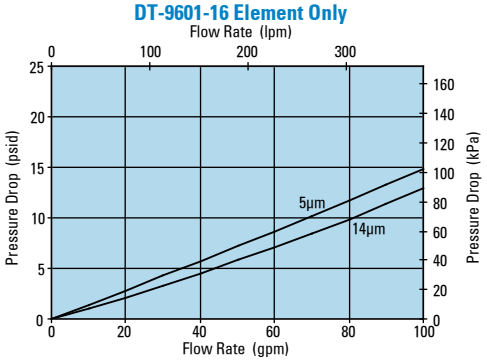
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

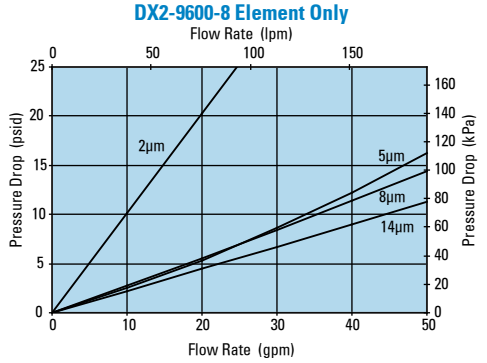
DT-9600-16 Element Only



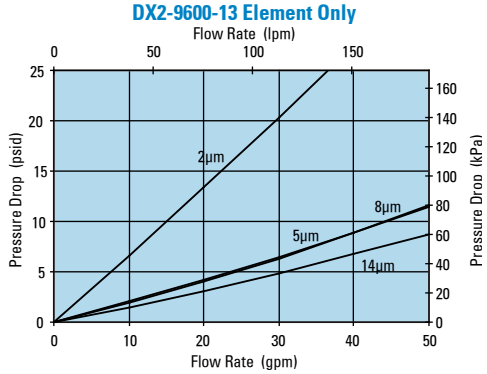
DT-9601-16 Element Only



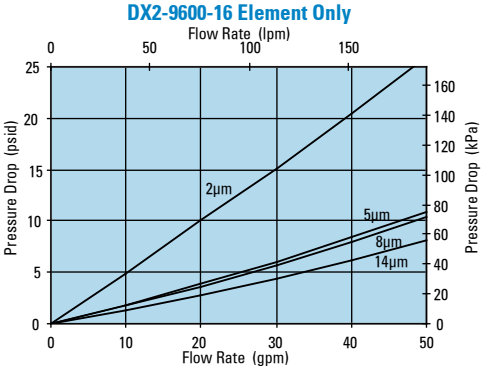
DX2-9600-8 Element Only



DX2-9600-13 Element Only



DX2-9600-16 Element Only



Donaldson

HPK05

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*

Synteq®

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 BunaN seals. The HPK05 filters contain Synteq®, Donaldson's exclusive synthetic fiber media formulated especially for liquid filtration.

Beta Rating
- Performance to $ß_{4(c)}$=1000

T-Type Porting Sizes
- 2" SAE 4-Bolt Flange (code 61)

Assembly Weight
- 63 lbs / 28.5

Replacement Filter Length
- 25.53"/648*mm*

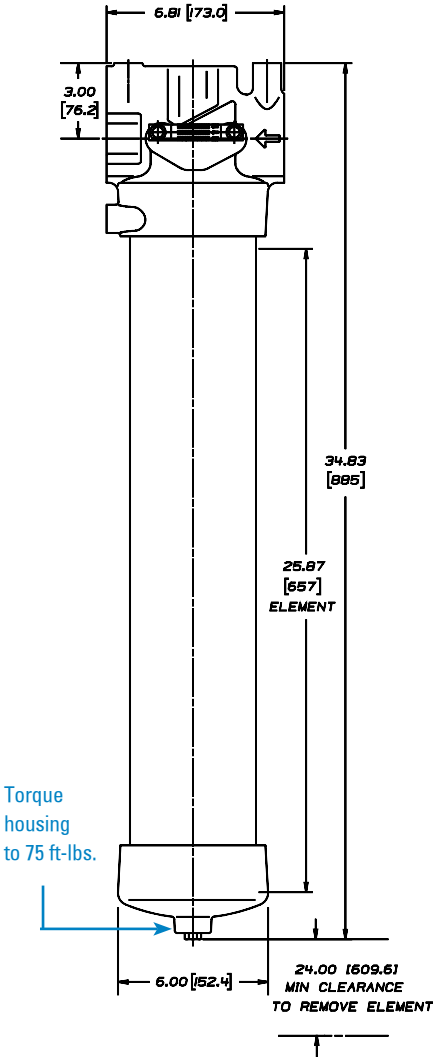
Standard Bypass Ratings
- 60 *psi* / 414 kPa / 4.1 bar with reverse- flow check valve
- No Bypass

Operating Temperatures
- -20°F to 250°F / -29°C to 121°C

Element Collapse Ratings
- 200 *psi* / 1380 kPa / 13.8 bar (standard)
- 3000 *psi* / 20,700 kPa / 206.9 bar (high collapse)

Donaldson

Assembly - Side View

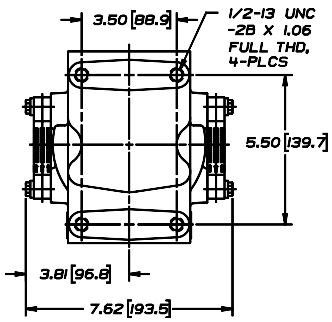


Applications:

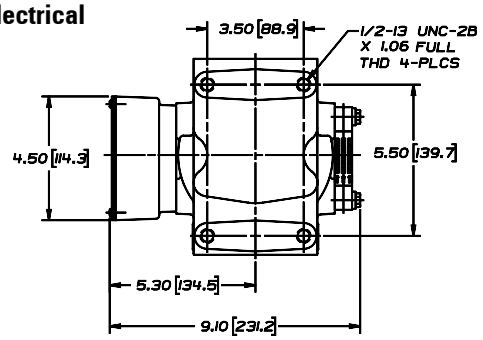
High Pressure Circuits
In-Plant & Mobile Equipment
Hydrostatic Transmissions
Centralized Lube Systems

Head Top View

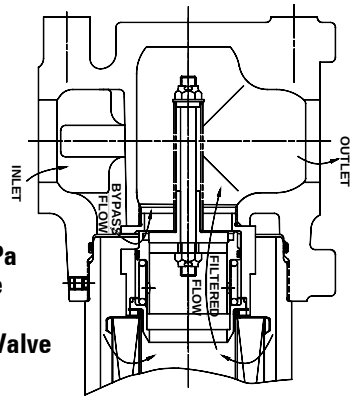
With 2 Visual Indicators



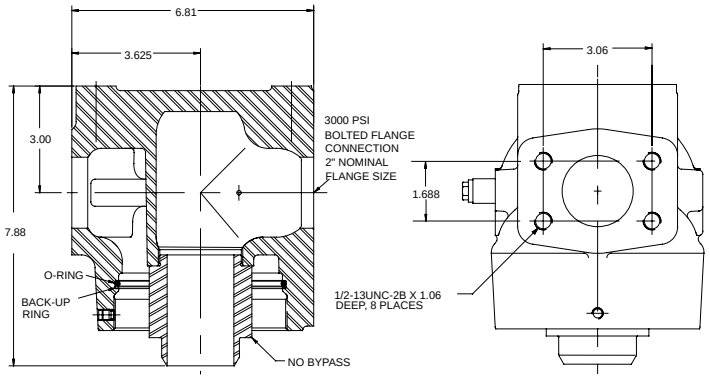
With Visual & Electrical Indicators



Bypass Valve Alternatives



60 psi /414 kPa Bypass Valve with Reverse Flow Check Valve



No Bypass

All dimensions above are shown in inches [millimeters]

Donaldson

HPK05 Components

Head & Housing Assemblies

Port Size[4]	Bypass Rating	Indicator Style/Location[1]	Assembly Number	Media Number	Element Part No.
2" SAE 4-Bolt Flange (Code 61)	60 psi / 414 kPa / 4.1 bar Reverse flow check valve	Visual, Left side	K052024	No. 9	P164229
	No Bypass	Visual & Electrical[2]	K052039	No. 9	P171037[3]

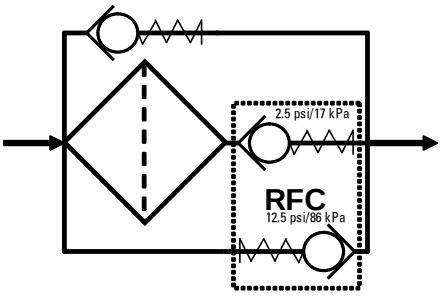
Assembly Notes

1 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.

2 Visual indicator is mounted on left side of the head; electrical indicator (P173929- 72 psid) is mounted on the right side.

3 Rated as high collapse (3000 psi / 20700 kPa); has Viton® seals.

Reverse Flow Check Schematic



Synteq® Element Choices

Media Number	$B_{x(c)}$ = 1000 Rating	Length (in./mm)	Part No.	Seal & Comments
No. 1	6 µm	25.5 / 648	P167841	BunaN
No. 2	9 µm	25.5 / 648	P164585	BunaN
No. 2½	10 µm	25.5 / 648	P164227	BunaN
			P164435 Built to order	Viton
No. 9	23 µm	25.5 / 648	P164229	BunaN
			P171037	Viton High Collapse

Element Notes

- Filters with seals made of BunaN are appropriate for most applications involving petroleum oil. Filters with seals made of fluoroelastomer (such ad 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. (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.

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	$Beta_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
2.5 µm	<4 µm	26/657.9	DT-9400-26-2UM	9400 Series
5 µm	5 µm	26/657.9	DT-9400-26-5UM	9400 Series
8 µm	8 µm	26/657.9	DT-9400-26-8UM	9400 Series
14 µm	14 µm	26/657.9	DT-9400-26-14UM	9400 Series
25 µm	25 µm	26/657.9	DT-9400-26-25UM	9400 Series
5 µm	5 µm	26/657.2	DT-9901-26-5UM	9901 Series: High Collapse
14 µm	14 µm	26/657.2	DT-9901-26-14UM	9901 Series: High Collapse

Filter Notes

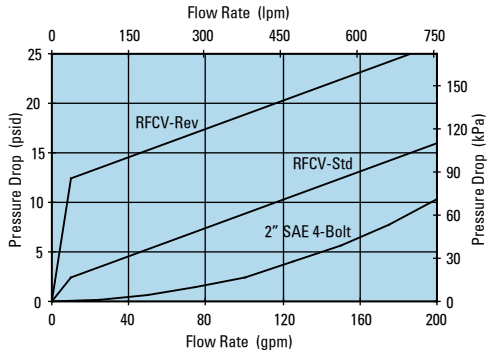
- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements are potted and seam-sealed with epoxy-based adhesives.
- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum endcaps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

Donaldson.

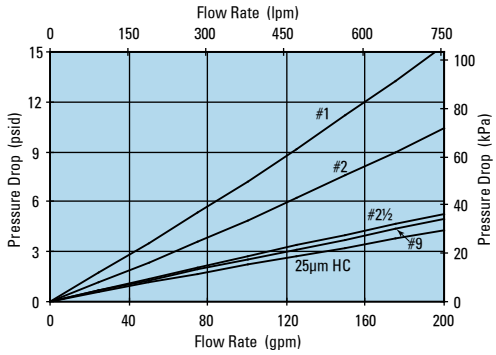
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

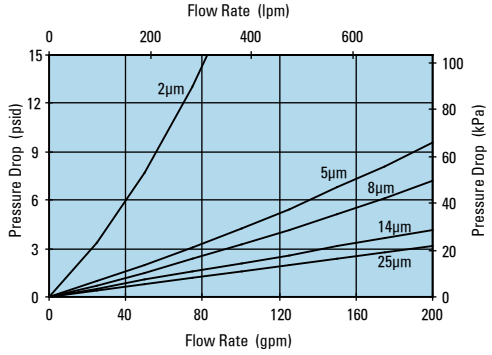
HPK05 Housing Only



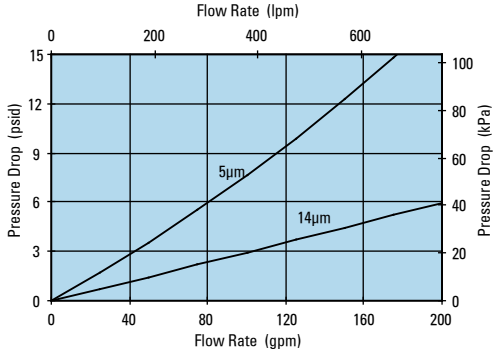
HPK05 Standard 26" Element Only



DT-9400-26 Element Only



DT-9901-26 Element Only



Donaldson

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.

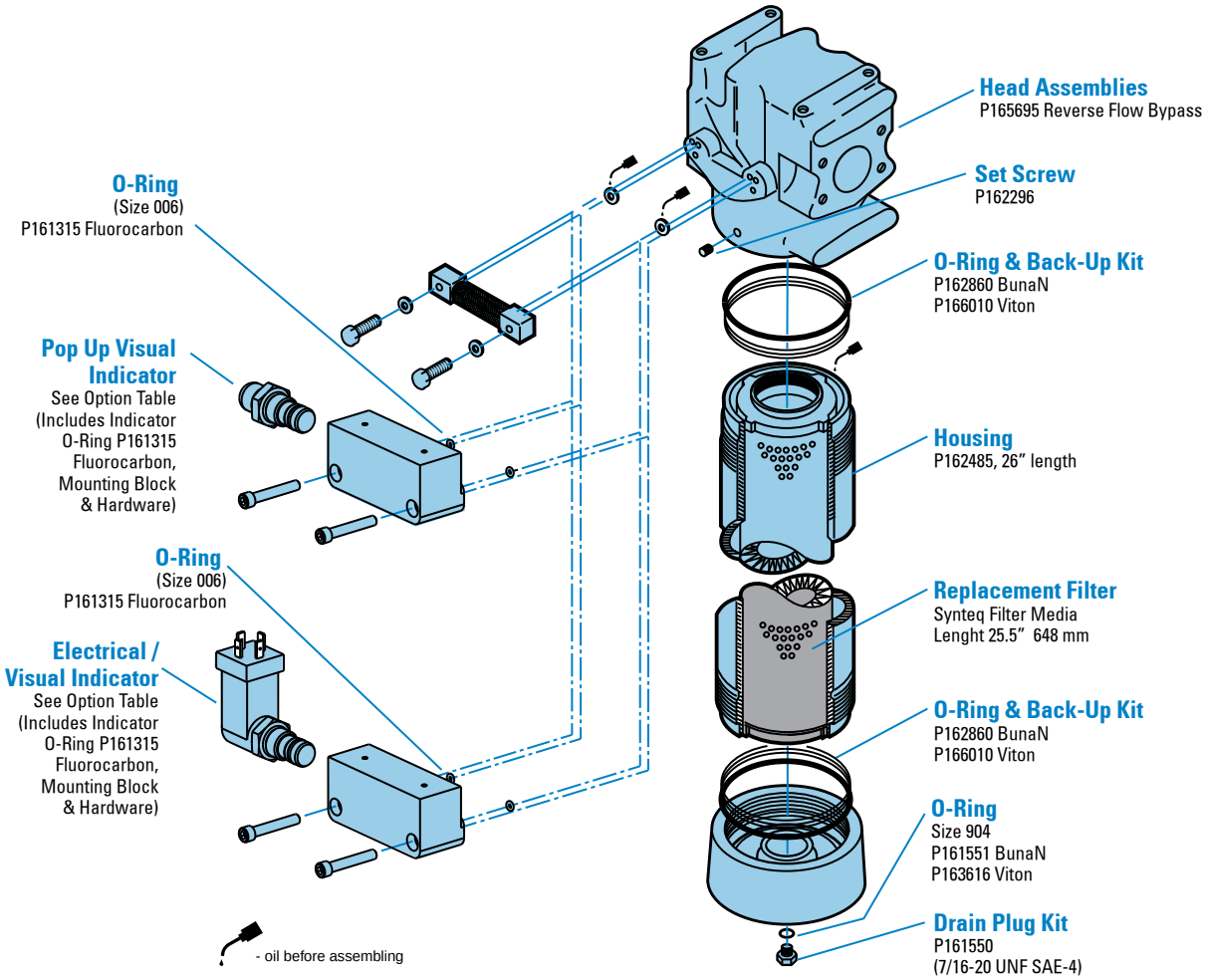
Indicator Service Parts

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

Donaldson

HPK05 Service Parts



Donaldson

W451

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 element 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 element. Donaldson Triboguard™ 4-layer media is offered in a variety of designs. Five different media grades are offered. Element 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 element available for use with non-bypass applications
- Wide range of indicator options
- Three bowl 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 $ß_{<4(c)}$=1000

T-Type and Manifold Porting Sizes
- SAE-20 O-Ring
- 1½" SAE 4 bolt Code 61 & 62
- Manifold Mount

Housing Weight
- 9": 56 lbs / 25.4 kg
- 18": 82 lbs / 37.5 kg
- 27": 109 lbs / 49.5 kg

Replacement Filter Lengths
- 9.12" / 231.8*mm*
- 18.20" / 462.3*mm*
- 27.66" / 702.5*mm*

Standard Bypass Ratings
- No Bypass
- 50 psi / 345 kPa / 3.5 bar
- 90 psi / 621 kPa / 6.2 bar

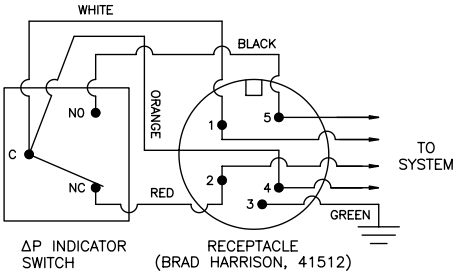
Operating Temperatures
- -45° to 250°F (-43° to 121°C)

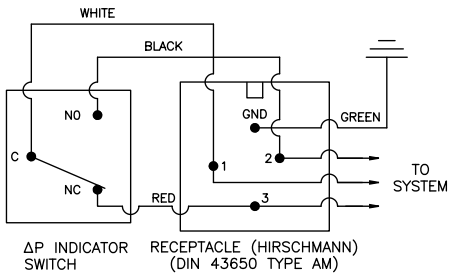
Element Collapse Ratings
- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

Donaldson

Indicator Switch Schematic Wiring Diagram

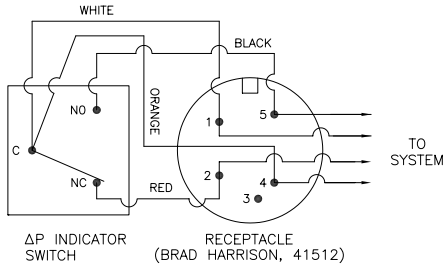
Aluminum Electrical Housings

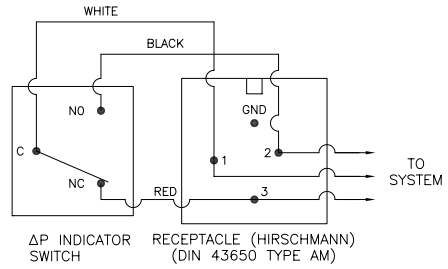




Note: The female plug (connector) is to be furnished by customer.

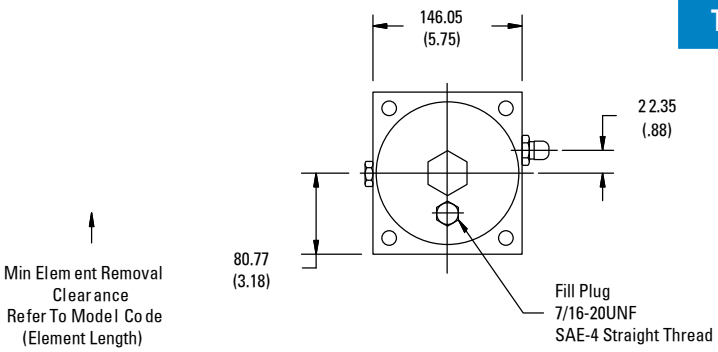
Plastic Electrical Housings



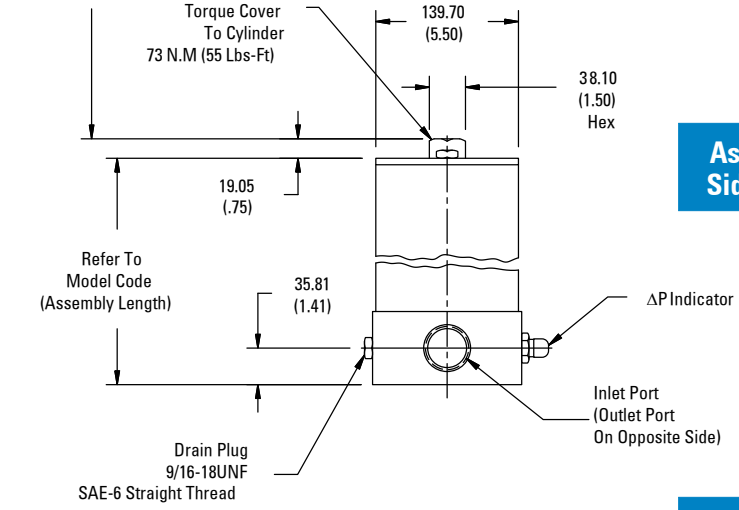


Note: The female plug (connector) is to be furnished by customer.

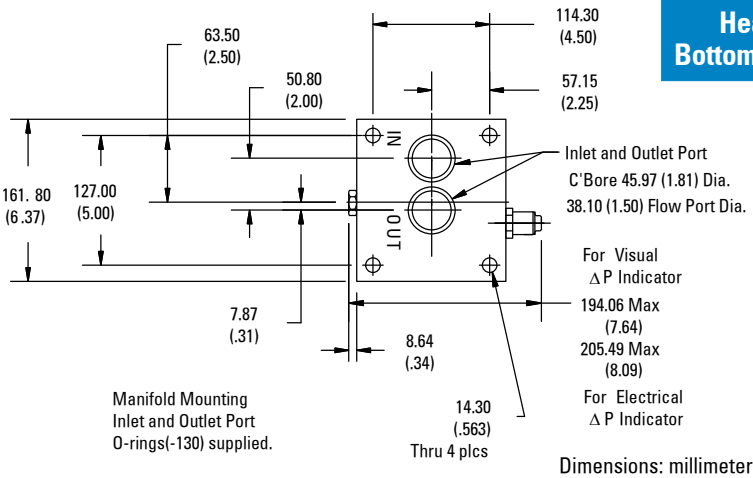
Assembly Top View



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.

Donaldson

W451 Components

Donaldson Triboguard Element Choices - Upgraded Performance

Media Number	Beta$_{x(c)}$=1000 Rating	Length (in./mm)	Donaldson Triboguard Part No.	Comments
5 µm	5 µm	9/231.8	DT-HF4-9-5UM	HF4 Series
8 µm	8 µm	9/231.8	DT-HF4-9-8UM	HF4 Series
14 µm	14 µm	9/231.8	DT-HF4-9-14UM	HF4 Series
25 µm	25 µm	9/231.8	DT-HF4-9-25UM	HF4 Series
5 µm	5 µm	18/462.3	DT-HF4-18-5UM	HF4 Series
8 µm	8 µm	18/462.3	DT-HF4-18-8UM	HF4 Series
14 µm	14 µm	18/462.3	DT-HF4-18-14UM	HF4 Series
25 µm	25 µm	18/462.3	DT-HF4-18-25UM	HF4 Series
5 µm	5 µm	27/702.5	DT-HF4-27-5UM	HF4 Series
8 µm	8 µm	27/702.5	DT-HF4-27-8UM	HF4 Series
14 µm	14 µm	27/702.5	DT-HF4-27-14UM	HF4 Series
25 µm	25 µm	27/702.5	DT-HF4-27-25UM	HF4 Series
5 µm	5 µm	9/233.5	DT-HF4HC-9-5UM	HF4 Series: High Collapse
14 µm	14 µm	9/233.5	DT-HF4HC-9-14UM	HF4 Series: High Collapse
WA	B>30$_{(c)}$ = 200	9/233.5	P569527	Absorbs 250 ml water @ 25 psid

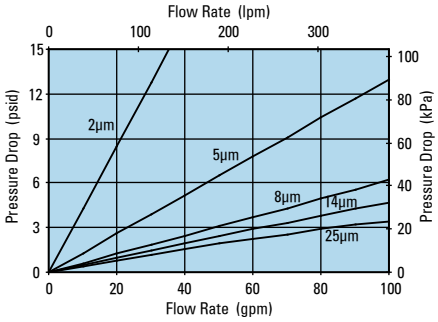
Filter Notes

- All Donaldson Triboguard elements utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson Triboguard elements 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.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined Aluminum end caps for greater element integrity in critical applications.
- Viton® seals are standard on all Donaldson Triboguard elements.

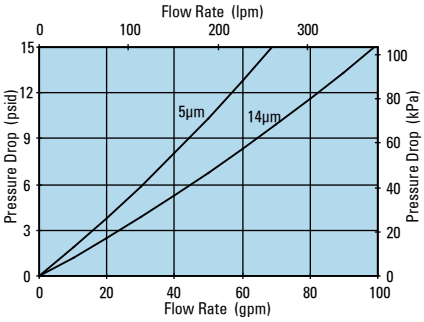
Performance Data

For a full explanation of how our performance curves were derived, see page 228.

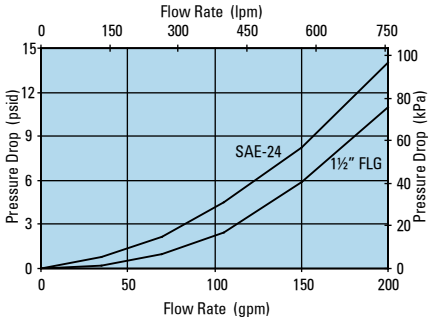
DT-HF-4 Element Only



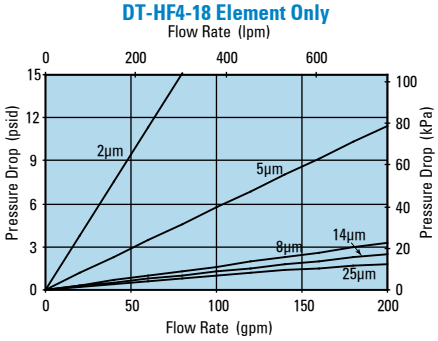
DT-HF4HC-9 Element Only



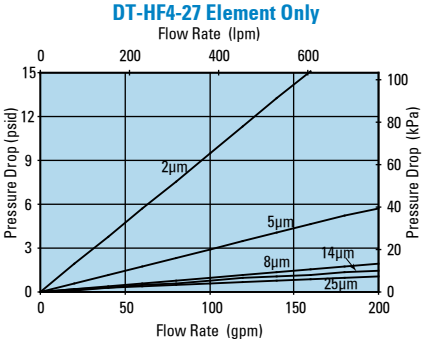
W451 Housing Only



DT-HF4-18 Element Only



DT-HF4-27 Element Only



Donaldson

Ordering Guide

Filter Assembly	W451	1	D	4	J | N	B	3
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6	TABLE 7
Service Element	Elements ordered separately. See page 136 for element choices.						

Table 1

Filter Assembly / Service Element

CODE	DESCRIPTION
W451	Assembly

Table 2

Element 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	1-7/8" - 12 UN (SAE 24)
E	1-1/2" 4 Bolt Flange Code 61
R	1-1/2" 4 Bolt Flange Code 62
S	Manifold Mounting
U	1-1/2" NPT

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 element.

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 & Element Length

CODE (LGTH)	ELEMENT LENGTH
3 (15.31")	9.0"
6 (24.70")	18.0"*
7 (34.00")	27.0"
8 (37.56")	36.0"

Note: Code lengths 6, 7 & 8 media elements may be stacked using connector part # P167324.

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

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Donaldson®
Triboguard™

High Performance Hydraulic Filters

Donaldson® Triboguard™ filters represent the state-of-the-art in hydraulic filtration technology. Donaldson Triboguard filters combine high removal efficiencies with exceptionally low-flow resistance and outstanding service life ensuring your system gets the protection it requires.

Features & Benefits

Advanced Pleat Pack Design

- Provides excellent pleat support and spacing
- Protects against media damage during handling and installation
- Excellent compatibility
- Allows for maximum effective media area

Greater Dirt Holding Capacity

- Extended filter life and change intervals
- Reduced maintenance costs

High Efficiency Media Grades

Performance to $ß_{<4(c)}$=1000 (per ISO 16889)

- Superior system protection

Donaldson

Donaldson has the Industry's Largest Selection of Replacement Hydraulic Filters

In-stock, ready to ship to you

Filter Cross-Reference!

http://crossreference.donaldson.com

Updated every 24 hours!

Backed by over 90 years of filtration leadership, technology & experience

Donaldson

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
0030D	BNHC	5	DT-0030-D -5UM		PR3031	0030D003BNHC	SBF-0030D-Z3B or V	
		8	DT-0030-D -8UM		PR3032	0030D005BNHC	SBF-0030D-Z5B or V	
		14	DT-0030-D -14UM		PR3033	0030D010BNHC	SBF-0030D-Z10B or V	
		25	DT-0030-D -25UM		PR3034	0030D020BNHC	SBF-0030D-Z25B or V	
0060D	BNHC	5	DT-0060-D -5UM	HC2206FKP3H or Z	PR3056	0060D003BNHC	SBF-0060D-Z3B or V	
		8	DT-0060-D-8UM	HC2206FKN3H or Z	PR3057	0060D005BNHC	SBF-0060D-Z5B or V	
		14	DT-0060-D-14UM	HC2206FKS3H or Z	PR3058	0060D010BNHC	SBF-0060D-Z10B or V	
		25	DT-0060-D-25UM	HC2206FKT3H or Z	PR3059	0060D020BNHC	SBF-0060D-Z25B or V	
0075D	BNHC	5	DT-0075-D-5UM			0075D003BNHC		
		8	DT-0075-D-8UM			0075D005BNHC		
		14	DT-0075-D-14UM			0075D010BNHC		
		25	DT-0075-D-25UM			0075D020BNHC		
0110D	BNHC	5	DT-0110-D-5UM	HC2206FKP6H or Z	PR3085	0110D003BNHC	SBF-0110D-Z3B or V	
		8	DT-0110-D-8UM	HC2206FKN6H or Z	PR3086	0110D005BNHC	SBF-0110D-Z5B or V	
		14	DT-0110-D-14UM	HC2206FKS6H or Z	PR3087	0110D010BNHC	SBF-0110D-Z10B or V	
		25	DT-0110-D-25UM	HC2206FKT6H or Z	PR3088	0110D020BNHC	SBF-0110D-Z25B or V	
0140D	BNHC	5	DT-0140-D-5UM	HC2206FKP8H or Z		0140D003BNHC		
		8	DT-0140-D-8UM	HC2206FKN8H or Z		0140D005BNHC		
		14	DT-0140-D-14UM	HC2206FKS8H or Z		0140D010BNHC		
		25	DT-0140-D-25UM	HC2206FKT8H or Z		0140D020BNHC		
0160D	BNHC	5	DT-0160-D-5UM	HC2216FKP4H or Z	PR3114	0160D003BNHC	SBF-0160D-Z3B or V	
		8	DT-0160-D-8UM	HC2216FKN4H or Z	PR3115	0160D005BNHC	SBF-0160D-Z5B or V	
		14	DT-0160-D-14UM	HC2216FKS4H or Z	PR3116	0160D010BNHC	SBF-0160D-Z10B or V	
		25	DT-0160-D-25UM	HC2216FKT4H or Z	PR3117	0160D020BNHC	SBF-0160D-Z25B or V	
0240D	BNHC	5	DT-0240-D-5UM	HC2216FKP6H or Z	PR3143	0240D003BNHC	SBF-0240D-Z3B or V	
		8	DT-0240-D-8UM	HC2216FKN6H or Z	PR3144	0240D005BNHC	SBF-0240D-Z5B or V	
		14	DT-0240-D-14UM	HC2216FKS6H or Z	PR3145	0240D010BNHC	SBF-0240D-Z10B or V	
		25	DT-0240-D-25UM	HC2216FKT6H or Z	PR3146	0240D020BNHC	SBF-0240D-Z25B or V	
0280D	BNHC	5	DT-0280-D-5UM			0280D003BNHC		
		8	DT-0280-D-8UM			0280D005BNHC		
		14	DT-0280-D-14UM			0280D010BNHC		
		25	DT-0280-D-25UM			0280D020BNHC		
0330D	BNHC	5	DT-0330-D-5UM	HC2233FKP6H or Z	PR3172	0330D003BNHC	SBF-0330D-Z3B or V	
		8	DT-0330-D-8UM	HC2233FKN6H or Z	PR3173	0330D005BNHC	SBF-0330D-Z5B or V	
		14	DT-0330-D-14UM	HC2233FKS6H or Z	PR3174	0330D010BNHC	SBF-0330D-Z10B or V	
		25	DT-0330-D-25UM	HC2233FKT6H or Z	PR3175	0330D020BNHC	SBF-0330D-Z25B or V	
0660D	BNHC	5	DT-0660-D-5UM	HC2233FKP13H or Z	PR3201	0660D003BNHC	SBF-0660D-Z3B or V	
		8	DT-0660-D-8UM	HC2233FKN13H or Z	PR3202	0660D005BNHC	SBF-0660D-Z5B or V	
		14	DT-0660-D-14UM	HC2233FKS13H or Z	PR3203	0660D010BNHC	SBF-0660D-Z10B or V	
		25	DT-0660-D-25UM	HC2233FKT13H or Z	PR3204	0660D020BNHC	SBF-0660D-Z25B or V	
0500D	BNHC	5	DT-0500-D-5UM			0500D003BN4HC		
		8	DT-0500-D-8UM			0500D050BN4HC		
		14	DT-0500-D-14UM			0500D010BN4HC		
		25	DT-0500-D-25UM			0500D020BN4HC		
0030D	BHHC	5	DT-0030-DHC-5UM			0030D003BHHC	SBF-0031D-Z3B or V	
		14	DT-0030-DHC-14UM			0030D010BHHC	SBF-0031D-Z10B or V	
0060D	BHHC	5	DT-0060-DHC-5UM	HC2207FDP3H or Z	PR3064	0060D003BHHC	SBF-0061D-Z3B or V	

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Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
		14	DT-0060-DHC-14UM	HC2207FDT3H or Z	PR3066	0060D010BHHC	SBF-0061D-Z10B or V	
0110D	BHHC	5	DT-0110-DHC-5UM	HC2207FDP6H or Z	PR3093	0110D003BHHC	SBF-0111D-Z3B or V	
		14	DT-0110-DHC-14UM	HC2207FDT6H or Z	PR3095	0110D010BHHC	SBF-0111D-Z10B or V	
0140D	BHHC	5	DT-0140-DHC-5UM			0140D003BHHC		
		14	DT-0140-DHC-14UM			0140D010BHHC		
0160D	BHHC	5	DT-0160-DHC-5UM	HC2217FDP4H or Z	PR3122	0160D003BHHC	SBF-0161D-Z3B or V	
		14	DT-0160-DHC-14UM	HC2217FDT4H or Z	PR3124	0160D010BHHC	SBF-0161D-Z10B or V	
0240D	BHHC	5	DT-0240-DHC-5UM	HC2217FDP6H or Z	PR3151	0240D003BHHC	SBF-0241D-Z3B or V	
		14	DT-0240-DHC-14UM	HC2217FDT6H or Z	PR3153	0240D010BHHC	SBF-0241D-Z10B or V	
0280D	BHHC	5	DT-0280-DHC-5UM			0280D003BHHC		
		14	DT-0280-DHC-14UM			0280D010BHHC		
0330D	BHHC	5	DT-0330-DHC-5UM	HC2237FDP6H or Z	PR3180	0330D003BHHC	SBF-0331D-Z3B or V	
		14	DT-0330-DHC-14UM	HC2237FDT6H or Z	PR3182	0330D010BHHC	SBF-0331D-Z10B or V	
0500D	BHHC	5	DT-0500-D-5UM			0500D003BH4HC		
		14	DT-0500-D-14UM			0500D010BH4HC		
0660D	BHHC	5	DT-0660-DHC-5UM	HC2237FDP13H or Z	PR3209	0660D003BHHC	SBF-0661D-Z3B or V	
		14	DT-0660-DHC-14UM	HC2237FDT13H or Z	PR3211	0660D010BHHC	SBF-0661D-Z10B or V	
0060R	BNHC	5	DT-0060-R-5UM	HC2196FKP4H or Z	PR3239	0060R003BNHC	SBF0060RZ3B or V	
		8	DT-0060-R-8UM	HC2196FKN4H or Z	PR3240	0060R005BNHC	SBF0060RZ5B or V	
0060R	BNHC	14	DT-0060-R-14UM	HC2196FKS4H or Z	PR3241	0060R010BNHC	SBF0060RZ10B or V	
		25	DT-0060-R-25UM	HC2196FKT4H or Z	PR3242	0060R020BNHC	SBF0060RZ25B or V	
0110R	BNHC	5	DT-0110-R-5UM	HC2196FKP6H or Z	PR3256	0110R003BNHC	SBF0110RZ3B or V	
		8	DT-0110-R-8UM	HC2196FKN6H or Z	PR3257	0110R005BNHC	SBF0110RZ5B or V	
		14	DT-0110-R-14UM	HC2196FKS6H or Z	PR3258	0110R010BNHC	SBF0110RZ10B or V	
		25	DT-0110-R-25UM	HC2196FKT6H or Z	PR3259	0110R020BNHC	SBF0110RZ25B or V	
0160R	BNHC	5	DT-0160-R-5UM	HC2226FKP4H or Z	PR3273	0160R003BNHC	SBF0160RZ3B or V	
		8	DT-0160-R-8UM	HC2226FKN4H or Z	PR3274	0160R005BNHC	SBF0160RZ5B or V	
		14	DT-0160-R-14UM	HC2226FKS4H or Z	PR3275	0160R010BNHC	SBF0160RZ10B or V	
		25	DT-0160-R-25UM	HC2226FKT4H or Z	PR3276	0160R020BNHC	SBF0160RZ25B or V	
0240R	BNHC	5	DT-0240-R-5UM	HC2226FKP6H or Z	PR3290	0240R003BNHC	SBF0240RZ3B or V	
		8	DT-0240-R-8UM	HC2226FKN6H or Z	PR3291	0240R005BNHC	SBF0240RZ5B or V	
		14	DT-0240-R-14UM	HC2226FKS6H or Z	PR3292	0240R010BNHC	SBF0240RZ10B or V	
		25	DT-0240-R-25UM	HC2226FKT6H or Z	PR3293	0240R020BNHC	SBF0240RZ25B or V	
0330R	BNHC	5	DT-0330-R-5UM	HC2246FKP6H or Z	PR3307	0330R003BNHC	SBF0330RZ3B or V	
		8	DT-0330-R-8UM	HC2246FKN6H or z	PR3308	0330R005BNHC	SBF0330RZ5B or V	
		14	DT-0330-R-14UM	HC2246FKS6H or Z	PR3309	0330R010BNHC	SBF0330RZ10B or V	
		25	DT-0330-R-25UM	HC2246FKT6H or Z	PR3310	0330R020BNHC	SBF0330RZ25B or V	
0660R	BNHC	5	DT-0660-R-5UM	HC2286FKP12H or Z	PR3324	0660R003BNHC	SBF0660RZ3B or V	
		8	DT-0660-R-8UM	HC2286FKN12H or Z	PR3325	0660R005BNHC	SBF0660RZ5B or V	
		14	DT-0660-R-14UM	HC2286FKS12H or Z	PR3326	0660R010BNHC	SBF0660RZ10B or V	
		25	DT-0660-R-25UM	HC2286FKT12H or Z	PR3327	0660R020BNHC	SBF0660RZ25B or V	
0850R	BNHC	5	DT-0850-R-5UM	HC2286FKP15H or Z		0850R003BNHC		
		8	DT-0850-R-8UM	HC2286FKN15H or Z		0850R005BNHC	SBF0850RZ5B or V	
		14	DT-0850-R-14UM	HC2286FKS15H or Z		0850R010BNHC	SBF0850RZ10B or V	
		25	DT-0850-R-25UM	HC2286FKT15H or Z		0850R020BNHC	SBF0850RZ25B or V	
0950R	BNHC	5	DT-0950-R-5UM	HC2296FKP14H or Z		0950R003BNHC		
		8	DT-0950-R-8UM	HC2296FKN14H or Z		0950R005BNHC		
		14	DT-0950-R-14UM	HC2296FKS14H or Z		0950R010BNHC	SBF0950RZ10B or V	

Donaldson

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
		25	DT-0950-R-25UM	HC2296FKT14H or Z		0950R020BNHC	SBF0950RZ25B or V	
1300R	BNHC	5	DT-1300-R-5UM	HC2296FKP18H or Z	934477	1300R003BNHC		
		8	DT-1300-R-8UM	HC2296FKN18H or Z	934478	1300R005BNHC		
		14	DT-1300-R-14UM	HC2296FKS18H or Z	934236	1300R010BNHC	SBF1300RZ10B or V	
		25	DT-1300-R-25UM	HC2296FKT18H or Z	934479	1300R020BNHC	SBF1300RZ25B or V	
2600R	BNHC	5	DT-2600-R-5UM	HC2296FKP36H or Z	934570	2600R003BNHC		
		8	DT-2600-R-8UM	HC2296FKN36H or Z	934571	2600R005BNHC		
		14	DT-2600-R-14UM	HC2296FKS36H or Z	934234	2600R010BNHC	SBF2600RZ10B or V	
		25	DT-2600-R-25UM	HC2296FKT36H or Z	934572	2600R020BNHC	SBF2600RZ25B or V	
8200	8''	2.5	DT-8200-8-2UM	HC8200FKZ8H or Z				
8200	8''	5	DT-8200-8-5UM	HC8200FKP8H or Z	933363Q	11608D03BN	SBF-8200-8Z3B or V	
8200	8''	8	DT-8200-8-8UM	HC8200FKN8H or Z	932266Q	11608D06BN	SBF-8200-8Z5B or V	
8200	8''	14	DT-8200-8-14UM	HC8200FKS8H or Z	933364Q	11608D12BN	SBF-8200-8Z10B or V	
8200	8''	25	DT-8200-8-25UM	HC8200FKT8H or Z	933365Q	11608D25BN	SBF-8200-8Z25B or V	
8200	13''	2.5	DT-8200-13-2UM	HC8200FKZ13H or Z				
8200	13''	5	DT-8200-13-5UM	HC8200FKP13H or Z		11613D03BN		
8200	13''	8	DT-8200-13-8UM	HC8200FKN13H or Z		11613D06BN	SBF-8200-13Z5B or V	
8200	13''	14	DT-8200-13-14UM	HC8200FKS13H or Z		11613D12BN		
8200	13''	25	DT-8200-13-25UM	HC8200FKT13H or Z		11613D25BN	SBF-8200-13Z2B or V	
8200	16''	2.5	DT-8200-16-2UM	HC8200FKZ16H or Z				
8200	16''	5	DT-8200-16-5UM	HC8200FKP16H or Z		11616D03BN		
8200	16''	8	DT-8200-16-8UM	HC8200FKN16H or Z		11616D06BN		
8200	16''	14	DT-8200-16-14UM	HC8200FKS16H or Z		11616D12BN		
8200	16''	25	DT-8200-16-25UM	HC8200FKT16H or Z		11616D25BN		
8300	8''	2.5	DT-8300-8-2UM	HC8300FKZ8H or Z			SBF-8300-8Z1V	
8300	8''	5	DT-8300-8-5UM	HC8300FKP8H or Z	927663Q	10608D03BN	SBF-8300-8Z3V	
8300	8''	8	DT-8300-8-8UM	HC8300FKN8H or Z	927861Q	10608D06BN	SBF-8300-8Z5V	
8300	8''	14	DT-8300-8-14UM	HC8300FKS8H or Z	927661Q	10608D12BN	SBF-8300-8Z10V	
8300	8''	25	DT-8300-8-25UM	HC8300FKT8H or Z	929099Q	10608D25BN	SBF-8300-8Z25V	
8300	16''	2.5	DT-8300-16-2UM	HC8300FKZ16H or Z			SBF-8300-16Z1V	
8300	16''	5	DT-8300-16-5UM	HC8300FKP16H or Z	933044Q	10616D03BN	SBF-8300-16Z3V	
8300	16''	8	DT-8300-16-8UM	HC8300FKN16H or Z	933045Q	10616D06BN	SBF-8300-16Z5V	
8300	16''	14	DT-8300-16-14UM	HC8300FKS16H or Z	933046Q	10616D12BN	SBF-8300-16Z10V	
8300	16''	25	DT-8300-16-25UM	HC8300FKT16H or Z	933047Q	10616D25BN	SBF-8300-16Z25V	
8300	39''	2.5	DT-8300-39-2UM	HC8300FKZ39H or Z			SBF-8300-39Z1V	
8300	39''	5	DT-8300-39-5UM	HC8300FKP39H or Z	932872Q	10639D03BN	SBF-8300-39Z3V	
8300	39''	8	DT-8300-39-8UM	HC8300FKN39H or Z	932873Q	10639D06BN	SBF-8300-39Z5V	
8300	39''	14	DT-8300-39-14UM	HC8300FKS39H or Z	932874Q	10639D12BN	SBF-8300-39Z10V	
8300	39''	25	DT-8300-39-25UM	HC8300FKT39H or Z	932875Q	10639D25BN	SBF-8300-39Z25V	
8310	16''	2.5	DT-8310-16-2UM	HC8310FKZ16H or Z			16QPML-Z1V	
8310	16''	5	DT-8310-16-5UM	HC8310FKP16H or Z	933044Q	11416D03BN	16QPML-Z3V	
8310	16''	8	DT-8310-16-8UM	HC8310FKN16H or Z	933045Q	11416D06BN	16QPML-Z5V	
8310	16''	14	DT-8310-16-14UM	HC8310FKS16H or Z	933046Q	11416D12BN	16QPML-Z10V	
8310	16''	25	DT-8310-16-25UM	HC8310FKT16H or Z	933047Q	11416D25BN	16QPML-Z25V	
8310	39''	2.5	DT-8310-39-2UM	HC8310FKZ39H or Z			39QPML-Z1V	
8310	39''	5	DT-8310-39-5UM	HC8310FKP39H or Z	932872Q	11439D03BN	39QPML-Z3V	
8310	39''	8	DT-8310-39-8UM	HC8310FKN39H or Z	932873Q	11439D06BN	39QPML-Z5V	
8310	39''	14	DT-8310-39-14UM	HC8310FKS39H or Z	932874Q	11439D12BN	39QPML-Z10V	

Donaldson.

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
8310	39''	25	DT-8310-39-25UM	HC8310FKT39H or Z	932875Q	11439D25BN	39QPML-Z25V	
8314	13''	5	DT-8314-13-5UM	HC8314FKP13H or Z				
8314	13''	8	DT-8314-13-8UM	HC8314FKN13H or Z				
8314	16''	2.5	DT-8314-16-2UM	HC8314FKZ16H or Z				
8314	16''	5	DT-8314-16-5UM	HC8314FKP16H or Z	934308Q		16QCL3V	
8314	16''	8	DT-8314-16-8UM	HC8314FKN16H or Z	934309Q		16QCL5V	
8314	16''	14	DT-8314-16-14UM	HC8314FKS16H or Z	934310Q		16QCL10V	
8314	16''	25	DT-8314-16-25UM	HC8314FKT16H or Z	934311Q		16QCL25V	
8314	39''	2.5	DT-8314-39-2UM	HC8314FKZ39H or Z				
8314	39''	5	DT-8314-39-5UM	HC8314FKP39H or Z	934121Q		39QCL3V	
8314	39''	8	DT-8314-39-8UM	HC8314FKN39H or Z	934122Q		39QCL5V	
8314	39''	14	DT-8314-39-14UM	HC8314FKS39H or Z	934123Q		39QCL10V	
8314	39''	25	DT-8314-39-25UM	HC8314FKT39H or Z	934124Q		39QCL25V	
8800	8''	2.5	DT-8800-8-2UM	HC8800FKZ8H or Z				
8800	8''	5	DT-8800-8-5UM	HC8800FKP8H or Z	930218Q		SBF-8800-8S1B	
8800	8''	8	DT-8800-8-8UM	HC8800FKN8H or Z	933377Q		SBF-8800-8Z5B or V	
8800	8''	14	DT-8800-8-14UM	HC8800FKS8H or Z	930219Q		SBF-8800-8Z10B or V	
8800	8''	25	DT-8800-8-25UM	HC8800FKT8H or Z	930220Q		SBF-8800-8Z25B or V	
8800	13''	2.5	DT-8800-13-2UM	HC8800FKZ13H or Z			SBF-8800-13Z1B or V	
8800	13''	5	DT-8800-13-5UM	HC8800FKP13H or Z	930222Q	11713D03BN	SBF-8800-13Z3B or V	
8800	13''	8	DT-8800-13-8UM	HC8800FKN13H or Z	933378Q	11713D06BN	SBF-8800-13Z5B or V	
8800	13''	14	DT-8800-13-14UM	HC8800FKS13H or Z	930223Q	11713D12BN	SBF-8800-13Z10B or V	
8800	13''	25	DT-8800-13-25UM	HC8800FKT13H or Z	930224Q	11713D25BN	SBF-8800-13Z2B or V	
8800	16''	2.5	DT-8800-16-2UM	HC8800FKZ16H or Z			SBF-8800-16Z1B or V	
8800	16''	5	DT-8800-16-5UM	HC8800FKP16H or Z	930226Q	11716D03BN	SBF-8800-16Z3B or V	
8800	16''	8	DT-8800-16-8UM	HC8800FKN16H or Z	931945Q	11716D06BN	SBF-8800-16Z5B or V	
8800	16''	14	DT-8800-16-14UM	HC8800FKS16H or Z	930227Q	11716D12BN	SBF-8800-16Z10B or V	
8800	16''	25	DT-8800-16-25UM	HC8800FKT16H or Z	930228Q	11716D25BN	SBF-8800-16Z2B or V	
8900	8''	2.5	DT-8900-8-2UM	HC8900FKZ8H or Z				
8900	8''	5	DT-8900-8-5UM	HC8900FKP8H or Z	933193Q	10808D03BN		
8900	8''	8	DT-8900-8-8UM	HC8900FKN8H or Z	929893Q	10808D06BN		
8900	8''	14	DT-8900-8-14UM	HC8900FKS8H or Z	929901Q	10808D12BN		
8900	8''	25	DT-8900-8-25UM	HC8900FKT8H or Z	929899Q	10808D25BN	SBF-8900-8Z25B or V	
8900	13''	2.5	DT-8900-13-2UM	HC8900FKZ13H or Z			SBF-8900-13Z1B or V	
8900	13''	5	DT-8900-13-5UM	HC8900FKP13H or Z	932662Q	10813D03BN	SBF-8900-13Z3B or V	
8900	13''	8	DT-8900-13-8UM	HC8900FKN13H or Z	929920Q	10813D06BN		
8900	13''	14	DT-8900-13-14UM	HC8900FKS13H or Z	929921Q	10813D12BN	SBF-8900-13Z10B or V	
8900	13''	25	DT-8900-13-25UM	HC8900FKT13H or Z	929923Q	10813D25BN	SBF-8900-13Z2B or V	
8900	16''	2.5	DT-8900-16-2UM	HC8900FKZ16H or Z			SBF-8900-16Z1B or V	
8900	16''	5	DT-8900-16-5UM	HC8900FKP16H or Z	933210Q	10816D03BN	SBF-8900-16Z3B or V	
8900	16''	8	DT-8900-16-8UM	HC8900FKN16H or Z	933211Q	10816D06BN	SBF-8900-16Z5B or V	
8900	16''	14	DT-8900-16-14UM	HC8900FKS16H or Z	933212Q	10816D12BN	SBF-8900-16Z10B or V	
8900	16''	25	DT-8900-16-25UM	HC8900FKT16H or Z	933213Q	10816D25BN	SBF-8900-16Z2B or V	
8900	26''	2.5	DT-8900-26-2UM	HC8900FKZ26H or Z				
8900	26''	5	DT-8900-26-5UM	HC8900FKP26H or Z	933218Q	10826D03BN	SBF-8900-26Z3B or V	
8900	26''	8	DT-8900-26-8UM	HC8900FKN26H or Z	933219Q	10826D06BN	SBF-8900-26Z5B or V	
8900	26''	14	DT-8900-26-14UM	HC8900FKS26H or Z	933220Q	10826D12BN	SBF-8900-26Z10B or V	
8900	26''	25	DT-8900-26-25UM	HC8900FKT26H or Z	933221Q	10826D25BN	SBF-8900-26Z25B or V	

Donaldson

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
8900	39''	2.5	DT-8900-39-2UM	HC8900FKZ39H or Z				
8900	39''	5	DT-8900-39-5UM	HC8900FKP39H or Z		10839D03BN	SBF-8900-39Z3B or V	
8900	39''	8	DT-8900-39-8UM	HC8900FKN39H or Z		10839D06BN	SBF-8900-39Z5B or V	
8900	39''	14	DT-8900-39-14UM	HC8900FKS39H or Z		10839D12BN	SBF-8900-39Z10B or V	
8900	39''	25	DT-8900-39-25UM	HC8900FKT39H or Z		10839D25BN	SBF-8900-39Z25B or V	
8904	8''	2.5	DT-8904-8-2UM	HC8904FKZ8H or Z			SBF-8914-8Z1B or V	
8904	8''	5	DT-8904-8-5UM	HC8904FKP8H or Z			SBF-8914-8Z3B or V	
8904	8''	8	DT-8904-8-8UM	HC8904FKN8H or Z			SBF-8914-8Z5B or V	
8904	8''	14	DT-8904-8-14UM	HC8904FKS8H or Z			SBF-8914-8Z10B or V	
8904	8''	25	DT-8904-8-25UM	HC8904FKT8H or Z			SBF-8914-8Z25B or V	
8904	13''	2.5	DT-8904-13-2UM	HC8904FKZ13H or Z			SBF-8914-13Z1B or V	
8904	13''	5	DT-8904-13-5UM	HC8904FKP13H or Z			SBF-8914-13Z3B or V	
8904	13''	8	DT-8904-13-8UM	HC8904FKN13H or Z			SBF-8914-13Z5B or V	
8904	13''	14	DT-8904-13-14UM	HC8904FKS13H or Z			SBF-8914-13Z10B or V	
8904	13''	25	DT-8904-13-25UM	HC8904FKT13H or Z			SBF-8914-13Z25B or V	
8904	16''	2.5	DT-8904-16-2UM	HC8904FKZ16H or Z			SBF-8914-16Z1B or V	
8904	16''	5	DT-8904-16-5UM	HC8904FKP16H or Z			SBF-8914-16Z3B or V	
8904	16''	8	DT-8904-16-8UM	HC8904FKN16H or Z			SBF-8914-16Z5B or V	
8904	16''	14	DT-8904-16-14UM	HC8904FKS16H or Z			SBF-8914-16Z10B or V	
8904	16''	25	DT-8904-16-25UM	HC8904FKT16H or Z			SBF-8914-16Z25B or V	
8904	26''	2.5	DT-8904-26-2UM	HC8904FKZ26H or Z			SBF-8914-26Z1B or V	
8904	26''	5	DT-8904-26-5UM	HC8904FKP26H or Z			SBF-8914-26Z3B or V	
8904	26''	8	DT-8904-26-8UM	HC8904FKN26H or Z			SBF-8914-26Z5B or V	
8904	26''	14	DT-8904-26-14UM	HC8904FKS26H or Z			SBF-8914-26Z10B or V	
8904	26''	25	DT-8904-26-25UM	HC8904FKT26H or Z			SBF-8914-26Z25B or V	
8904	39''	2.5	DT-8904-39-2UM	HC8904FKZ39H or Z			SBF-8914-39Z1B or V	
8904	39''	5	DT-8904-39-5UM	HC8904FKP39H or Z			SBF-8914-39Z3B or V	
8904	39''	8	DT-8904-39-8UM	HC8904FKN39H or Z			SBF-8914-39Z5B or V	
8904	39''	14	DT-8904-39-14UM	HC8904FKS39H or Z			SBF-8914-39Z10B or V	
8904	39''	25	DT-8904-39-25UM	HC8904FKT39H or Z			SBF-8914-39Z25B or V	
9020	4''	2.5	DT-9020-4-2UM	HC9020FKZ4H or Z			SBF-9020-4Z1B or V	
9020	4''	5	DT-9020-4-5UM	HC9020FKP4H or Z	932610Q	10704D03BN	SBF-9020-4Z3B or V	
9020	4''	8	DT-9020-4-8UM	HC9020FKN4H or Z	933239Q	10704D06BN	SBF-9020-4Z5B or V	
9020	4''	14	DT-9020-4-14UM	HC9020FKS4H or Z	925580Q	10704D12BN	SBF-9020-4Z10B or V	
9020	4''	25	DT-9020-4-25UM	HC9020FKT4H or Z	930369Q	10704D25BN	SBF-9020-4Z25B or V	
9020	8''	2.5	DT-9020-8-2UM	HC9020FKZ8H or Z			SBF-9020-8Z1B or V	
9020	8''	5	DT-9020-8-5UM	HC9020FKP8H or Z	925602Q	10708D03BN	SBF-9020-8Z3B or V	
9020	8''	8	DT-9020-8-8UM	HC9020FKN8H or Z	933246Q	10708D06BN	SBF-9020-8Z5B or V	
9020	8''	14	DT-9020-8-14UM	HC9020FKS8H or Z	925600Q	10708D12BN	SBF-9020-8Z10B or V	
9020	8''	25	DT-9020-8-25UM	HC9020FKT8H or Z	930370Q	10708D25BN	SBF-9020-8Z25B or V	
9021	4''	5	DT-9021-4-5UM	HC9021FDP4H or Z	927725Q	10704D03BH	SBF-9021-4Z3B or V	
9021	4''	14	DT-9021-4-14UM	HC9021FDT4H or Z	928642Q	10704D17BH	SBF-9021-4Z10B or V	
9021	8''	5	DT-9021-8-5UM	HC9021FDP8H or Z	927723Q	10708D03BH	SBF-9021-8Z3B or V	
9021	8''	14	DT-9021-8-14UM	HC9021FDT8H or Z	928643Q	10708D17BH	SBF-9021-8Z10B or V	
9100	8''	2.5	DT-9100-8-2UM	HC9100FKZ8H or Z				
9100	8''	5	DT-9100-8-5UM	HC9100FKP8H or Z		11208D03BN		
9100	8''	8	DT-9100-8-8UM	HC9100FKN8H or Z		11208D06BN		
9100	8''	14	DT-9100-8-14UM	HC9100FKS8H or Z		11208D12BN		

Donaldson

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
9100	8''	25	DT-9100-8-25UM	HC9100FKT8H or Z		11208D25BN		
9100	13''	2.5	DT-9100-13-2UM	HC9100FKZ13H or Z				
9100	13''	5	DT-9100-13-5UM	HC9100FKP13H or Z		11213D03BN		
9100	13''	8	DT-9100-13-8UM	HC9100FKN13H or Z		11213D06BN		
9100	13''	14	DT-9100-13-14UM	HC9100FKS13H or Z		11213D12BN		
9100	13''	25	DT-9100-13-25UM	HC9100FKT13H or Z		11213D25BN		
9400	13''	2.5	DT-9400-13-2UM	HC9400FKZ13H or Z				
9400	13''	5	DT-9400-13-5UM	HC9400FKP13H or Z	929884Q	11013D03BN	SBF-9400-13Z3B or V	
9400	13''	8	DT-9400-13-8UM	HC9400FKN13H or Z	929886Q	11013D06BN	SBF-9400-13Z5B or V	
9400	13''	14	DT-9400-13-14UM	HC9400FKS13H or Z	929885Q	11013D12BN	SBF-9400-13Z10B or V	
9400	13''	25	DT-9400-13-25UM	HC9400FKT13H or Z	933253Q	11013D25BN	SBF-9400-13Z2B or V	
9400	26''	2.5	DT-9400-26-2UM	HC9400FKZ26H or Z				
9400	26''	5	DT-9400-26-5UM	HC9400FKP26H or Z	929882Q	11026D03BN	SBF-9400-26Z3B or V	
9400	26''	8	DT-9400-26-8UM	HC9400FKN26H or Z	929892Q	11026D06BN	SBF-9400-26Z5B or V	
9400	26''	14	DT-9400-26-14UM	HC9400FKS26H or Z	929891Q	11026D12BN	SBF-9400-26Z10B or V	
9400	26''	25	DT-9400-26-25UM	HC9400FKT26H or Z	933258Q	11026D26BN	SBF-9400-26Z2B or V	
9400	39''	2.5	DT-9400-39-2UM	HC9400FKZ39H or Z			SBF-9400-39Z1B or V	
9400	39''	5	DT-9400-39-5UM	HC9400FKP39H or Z	933263Q	11039D03BN	SBF-9400-39Z3B or V	
9400	39''	8	DT-9400-39-8UM	HC9400FKN39H or Z	933264Q	11039D06BN	SBF-9400-39Z5B or V	
9400	39''	14	DT-9400-39-14UM	HC9400FKS39H or Z	933264Q	11039D12BN	SBF-9400-39Z10B or V	
9400	39''	25	DT-9400-39-25UM	HC9400FKT39H or Z	933266Q	11039D25BN	SBF-9400-39S1	
9404	8''	2.5	DT-9404-8-2UM	HC9404FKZ8H or Z				
9404	8''	5	DT-9404-8-5UM	HC9404FKP8H or Z				
9404	8''	8	DT-9404-8-8UM	HC9404FKN8H or Z				
9404	8''	14	DT-9404-8-14UM	HC9404FKS8H or Z				
9404	8''	25	DT-9404-8-25UM	HC9404FKT8H or Z				
9404	12"	14	DT-9404-12-14UM	HC9404FKS12H or Z				
9404	13''	2.5	DT-9404-13-2UM	HC9404FKZ13H or Z				
9404	13''	5	DT-9404-13-5UM	HC9404FKP13H or Z				
9404	13''	8	DT-9404-13-8UM	HC9404FKN13H or Z				
9404	13''	14	DT-9404-13-14UM	HC9404FKS13H or Z				
9404	13''	25	DT-9404-13-25UM	HC9404FKT13H or Z				
9404	16''	2.5	DT-9404-16-2UM	HC9404FKZ16H or Z				
9404	16''	5	DT-9404-16-5UM	HC9404FKP16H or Z				
9404	16''	8	DT-9404-16-8UM	HC9404FKN16H or Z				
9404	16''	14	DT-9404-16-14UM	HC9404FKS16H or Z				
9404	16''	25	DT-9404-16-25UM	HC9404FKT16H or Z				
9404	26''	2.5	DT-9404-26-2UM	HC9404FKZ26H or Z				
9404	26''	5	DT-9404-26-5UM	HC9404FKP26H or Z				
9404	26''	8	DT-9404-26-8UM	HC9404FKN26H or Z				
9404	26''	14	DT-9404-26-14UM	HC9404FKS26H or Z				
9404	26''	25	DT-9404-26-25UM	HC9404FKT26H or Z				
9404	39''	2.5	DT-9404-39-2UM	HC9404FKZ39H or Z				
9404	39''	5	DT-9404-39-5UM	HC9404FKP39H or Z				
9404	39''	8	DT-9404-39-8UM	HC9404FKN39H or Z				
9404	39''	14	DT-9404-39-14UM	HC9404FKS39H or Z				
9404	39''	25	DT-9404-39-25UM	HC9404FKT39H or Z				
9600	4''	2.5	DT-9600-4-2UM	HC9600FKZ4H or Z			SBF-9600-4Z1B or V	

Donaldson

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
9600	4''	5	DT-9600-4-5UM	HC9600FKP4H or Z	926696Q	11104D03BN	SBF-9600-4Z3B or V	
9600	4''	8	DT-9600-4-8UM	HC9600FKN4H or Z	926841Q	11104D06BN	SBF-9600-4Z5B or V	
9600	4''	14	DT-9600-4-14UM	HC9600FKS4H or Z	926835Q	11104D12BN	SBF-9600-4Z10B or V	
9600	4''	25	DT-9600-4-25UM	HC9600FKT4H or Z	930099Q	11104D25BN	SBF-9600-4Z25B or V	
9600	8''	2.5	DT-9600-8-2UM	HC9600FKZ8H or Z			SBF-9600-8Z1B or V	
9600	8''	5	DT-9600-8-5UM	HC9600FKP8H or Z	926697Q	11108D03BN	SBF-9600-8Z3B or V	
9600	8''	8	DT-9600-8-8UM	HC9600FKN8H or Z	926843Q	11108D06BN	SBF-9600-8Z5B or V	
9600	8''	14	DT-9600-8-14UM	HC9600FKS8H or Z	926837Q	11108D12BN	SBF-9600-8Z10B or V	
9600	8''	25	DT-9600-8-25UM	HC9600FKT8H or Z	930118Q	11108D25BN	SBF-9600-8Z25B or V	
9600	13''	2.5	DT-9600-13-2UM	HC9600FKZ13H or Z			SBF-9600-13Z1B or V	
9600	13''	5	DT-9600-13-5UM	HC9600FKP13H or Z	926698Q	11113D03BN	SBF-9600-13Z3B or V	
9600	13''	8	DT-9600-13-8UM	HC9600FKN13H or Z	926845Q	11113D06BN	SBF-9600-13Z5B or V	
9600	13''	14	DT-9600-13-14UM	HC9600FKS13H or Z	926839Q	11113D12BN	SBF-9600-13Z10B or V	
9600	13''	25	DT-9600-13-25UM	HC9600FKT13H or Z	930162Q	11113D25BN	SBF-9600-13Z25B or V	
9600	16''	2.5	DT-9600-16-2UM	HC9600FKZ16H or Z			SBF-9600-16Z1B or V	
9600	16''	5	DT-9600-16-5UM	HC9600FKP16H or Z	926699Q	11116D03BN	SBF-9600-16Z3B or V	
9600	16''	8	DT-9600-16-8UM	HC9600FKN16H or Z	926890Q	11116D06BN	SBF-9600-16Z5B or V	
9600	16''	14	DT-9600-16-14UM	HC9600FKS16H or Z	926888Q	11116D12BN	SBF-9600-16Z10B or V	
9600	16''	25	DT-9600-16-25UM	HC9600FKT16H or Z	930164Q	11116D25BN	SBF-9600-16Z25B or V	
9601	4''	5	DT-9601-4-5UM	HC9601FDP4H or Z	927170Q	11104D03BH	SBF-9601-4Z3B or V	
9601	4''	14	DT-9601-4-14UM	HC9601FDT4H or Z	927169Q	11104D17BH	SBF-9601-4Z10B or V	
9601	8''	5	DT-9601-8-5UM	HC9601FDP8H or Z	927176Q	11108D03BH	SBF-9601-8Z3B or V	
9601	8''	14	DT-9601-8-14UM	HC9601FDT8H or Z	927175Q	11108D17BH	SBF-9601-8Z10B or V	
9601	13''	5	DT-9601-13-5UM	HC9601FDP13H or Z	927182Q	11113D03BH	SBF-9601-13Z3B or V	
9601	13''	14	DT-9601-13-14UM	HC9601FDT13H or Z	927181Q	11113D17BH	SBF-9601-13Z10B or V	
9601	16''	5	DT-9601-16-5UM	HC9601FDP16H or Z	928143Q	11116D03BH	SBF-9601-16Z3B or V	
9601	16''	14	DT-9601-16-14UM	HC9601FDT16H or Z	928142Q	11116D17BH	SBF-9601-16Z10B or V	
9604	8''	2.5	DT-9604-8-2UM	HC9604FKZ8H or Z				
9604	8''	5	DT-9604-8-5UM	HC9604FKP8H or Z				
9604	8''	8	DT-9604-8-8UM	HC9604FKN8H or Z				
9604	8''	14	DT-9604-8-14UM	HC9604FKS8H or Z				
9604	8''	25	DT-9604-8-25UM	HC9604FKT8H or Z				
9604	13''	2.5	DT-9604-13-2UM	HC9604FKZ13H or Z				
9604	13''	5	DT-9604-13-5UM	HC9604FKP13H or Z				
9604	13''	8	DT-9604-13-8UM	HC9604FKN13H or Z				
9604	13''	14	DT-9604-13-14UM	HC9604FKS13H or Z				
9604	13''	25	DT-9604-13-25UM	HC9604FKT13H or Z				
9604	16''	2.5	DT-9604-16-2UM	HC9604FKZ16H or Z				
9604	16''	5	DT-9604-16-5UM	HC9604FKP16H or Z				
9604	16''	8	DT-9604-16-8UM	HC9604FKN16H or Z				
9604	16''	14	DT-9604-16-14UM	HC9604FKS16H or Z				
9604	16''	25	DT-9604-16-25UM	HC9604FKT16H or Z				
9600	8''	5	DX2-9600-8-5UM	HC9600FKP8H or Z	926697Q	11108D03BN	SBF-9600-8Z3B or V	DX2 Non-Metallic Core Dual Element
9600	8''	8	DX2-9600-8-8UM	HC9600FKN8H or Z	926843Q	11108D06BN	SBF-9600-8Z5B or V	DX2 Non-Metallic Core Dual Element
9600	8''	14	DX2-9600-8-14UM	HC9600FKS8H or Z	926837Q	11108D12BN	SBF-9600-8Z10B or V	DX2 Non-Metallic Core Dual Element
9600	13''	5	DX2-9600-13-5UM	HC9600FKP13H or Z	926698Q	11113D03BN	SBF-9600-13Z3B or V	DX2 Non-Metallic Core Dual Element

Donaldson

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
9600	13''	8	DX2-9600-13-8UM	HC9600FKN13H or Z	926845Q	11113D06BN	SBF-9600-13Z5B or V	DX2 Non-Metallic Core Dual Element
9600	13''	14	DX2-9600-13-14UM	HC9600FKS13H or Z	926839Q	11113D12BN	SBF-9600-13Z10B or V	DX2 Non-Metallic Core Dual Element
9600	16''	5	DX2-9600-16-5UM	HC9600FKP16H or Z	926699Q	11116D03BN	SBF-9600-16Z3B or V	DX2 Non-Metallic Core Dual Element
9600	16''	8	DX2-9600-16-8UM	HC9600FKN16H or Z	926890Q	11116D06BN	SBF-9600-16Z5B or V	DX2 Non-Metallic Core Dual Element
9600	16''	14	DX2-9600-16-14UM	HC9600FKS16H or Z	926888Q	11116D12BN	SBF-9600-16Z10B or V	DX2 Non-Metallic Core Dual Element
9650	8''	2.5	DT-9650-8-2UM	HC9650FKZ8H or Z			SBF-9650-8Z1B or V	
9650	8''	5	DT-9650-8-5UM	HC9650FKP8H or Z	926992Q	11808D03BN	SBF-9650-8Z3B or V	
9650	8''	8	DT-9650-8-8UM	HC9650FKN8H or Z	926988Q	11808D05BN	SBF-9650-8Z5B or V	
9650	8''	14	DT-9650-8-14UM	HC9650FKS8H or Z	926990Q	11808D012BN	SBF-9650-8Z10B or V	
9650	8''	25	DT-9650-8-25UM	HC9650FKT8H or Z	933295Q	11808D025BN	SBF-9650-8Z25B or V	
9650	16''	2.5	DT-9650-16-2UM	HC9650FKZ16H or Z			SBF-9650-16Z1B or V	
9650	16''	5	DT-9650-16-5UM	HC9650FKP16H or Z	926998Q	11816D03BN	SBF-9650-16Z3B or V	
9650	16''	8	DT-9650-16-8UM	HC9650FKN16H or Z	926994Q	11816D05BN	SBF-9650-16Z5B or V	
9650	16''	14	DT-9650-16-14UM	HC9650FKS16H or Z	926996Q	11816D12BN	SBF-9650-16Z10B or V	
9650	16''	25	DT-9650-16-25UM	HC9650FKT16H or Z	933302Q	11816D25BN	SBF-9650-16Z25B or V	
9651	8''	5	DT-9651-8-5UM	HC9651FDP8H or Z	928152Q	11808D03BH	SBF-9651-8Z3B or V	
9651	8''	14	DT-9651-8-14UM	HC9651FDT8H or Z	928150Q	11808D17BH	SBF-9651-8Z10B or V	
9651	16''	5	DT-9651-16-5UM	HC9651FDP16H or Z	928156Q	11816D03BH	SBF-9651-16Z3B or V	
9651	16''	14	DT-9651-16-14UM	HC9651FDT16H or Z	928154Q	11816D17BH	SBF-9651-16Z10B or V	
9800	4''	2.5	DT-9800-4-2UM	HC9800FKZ4H or Z			SBF-9800-4Z1B or V	
9800	4''	5	DT-9800-4-5UM	HC9800FKP4H or Z	930189Q	11304D03BN	SBF-9800-4Z3B or V	
9800	4''	8	DT-9800-4-8UM	HC9800FKN4H or Z	930197Q	11304D06BN	SBF-9800-4Z5B or V	
9800	4''	14	DT-9800-4-14UM	HC9800FKS4H or Z	930190Q	11304D12BN	SBF-9800-4Z10B or V	
9800	4''	25	DT-9800-4-25UM	HC9800FKT4H or Z	930191Q	11304D25BN	SBF-9800-4Z25B or V	
9800	8''	2.5	DT-9800-8-2UM	HC9800FKZ8H or Z			SBF-9800-8Z1B or V	
9800	8''	5	DT-9800-8-5UM	HC9800FKP8H or Z	930191Q	11308D03BN	SBF-9800-8Z3B or V	
9800	8''	8	DT-9800-8-8UM	HC9800FKN8H or Z	930198Q	11308D06BN	SBF-9800-8Z5B or V	
9800	8''	14	DT-9800-8-14UM	HC9800FKS8H or Z	930193Q	11308D12BN	SBF-9800-8Z10B or V	
9800	8''	25	DT-9800-8-25UM	HC9800FKT8H or Z	930194Q	11308D25BN	SBF-9800-8Z25B or V	
9800	13''	2.5	DT-9800-13-2UM	HC9800FKZ13H or Z			SBF-9800-13Z1B or V	
9800	13''	5	DT-9800-13-5UM	HC9800FKP13H or Z	933782Q	11313D03BN	SBF-9800-13Z3B or V	
9800	13''	8	DT-9800-13-8UM	HC9800FKN13H or Z	933784Q	11313D06BN	SBF-9800-13Z5B or V	
9800	13''	14	DT-9800-13-14UM	HC9800FKS13H or Z	933786Q	11313D12BN	SBF-9800-13Z10B or V	
9800	13''	25	DT-9800-13-25UM	HC9800FKT13H or Z	933788Q	11313D25BN	SBF-9800-13Z25B or V	
9801	4''	5	DT-9801-4-5UM	HC9801FDP4H or Z	935191	11304D03BH	SBF-9801-4Z3B or V	
9801	4''	14	DT-9801-4-14UM	HC9801FDT4H or Z	935192	11304D17BH	SBF-9801-4Z10B or V	
9801	8''	5	DT-9801-8-5UM	HC9801FDP8H or Z	935193	11308D03BH	SBF-9801-8Z3B or V	
9801	8''	14	DT-9801-8-14UM	HC9801FDT8H or Z	935194	11308D17BH	SBF-9801-8Z10B or V	
9801	13''	5	DT-9801-13-5UM	HC9801FDP13H or Z		11313D03BH	SBF-9801-13Z3B or V	
9801	13''	14	DT-9801-13-14UM	HC9801FDT13H or Z		11313D17BH	SBF-9801-13Z10B or V	
9901	13	5	DT-9901-13-5UM	HC9901FKP13H or Z	935195	H9901-13-003BH	SBF-9901-13Z3B or V	
9901	13	14	DT-9901-13-14UM	HC9901FKS13H or Z		H9901-13-010BH		
9901	26''	5	DT-9901-26-5UM	HC9901FKP26H or Z	935197	H9901-26-003BH	SBF-9901-26Z3B or V	
9901	26''	14	DT-9901-26-14UM	HC9901FKT26H or Z	935198	H9901-26-010BH		
9901	39''	5	DT-9901-39-5UM	HC9901FKP39H or Z	935199	H9901-39-003BH	SBF-9901-39Z3B or V	
9901	39''	14	DT-9901-39-14UM	HC9901FKS39H or Z		H9901-39-010BH		

Donaldson

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
170	1	5	DT-0170-1-5UM					
170		8	DT-0170-1-8UM					
170		14	DT-0170-1-14UM					
170		25	DT-0170-1-25UM					
170	2	5	DT-0170-2-5UM					
170		8	DT-0170-2-8UM					
170		14	DT-0170-2-14UM					
170		25	DT-0170-2-25UM					
270	1	5	DT-0270-1-5UM					
		8	DT-0270-1-8UM					
		14	DT-0270-1-14UM					
		25	DT-0270-1-25UM					
	2	5	DT-0270-2-5UM					
		8	DT-0270-2-8UM					
		14	DT-0270-2-14UM					
		25	DT-0270-2-25UM					
370	1	5	DT-0370-1-5UM					
		8	DT-0370-1-8UM					
		14	DT-0370-1-14UM					
		25	DT-0370-1-25UM					
	2	5	DT-0370-2-5UM					
		8	DT-0370-2-8UM					
		14	DT-0370-2-14UM					
		25	DT-0370-2-25UM					
	3	5	DT-0370-3-5UM					
		8	DT-0370-3-8UM					
		14	DT-0370-3-14UM					
		25	DT-0370-3-25UM					
RF2/IL2	1	2	DT-RFIL2-1-2UM					
		5	DT-RFIL2-1-5UM	HC2252FKP10H or Z	932686Q		SBF10019Z3B or V	
		8	DT-RFIL2-1-8UM	HC2252FKN10H or Z	932362		SBF10019Z5B or V	
		14	DT-RFIL2-1-14UM	HC2252FKS10H or Z	932409		SBF10019Z10B or V	
		25	DT-RFIL2-1-25UM	HC2252FKT10H or Z	934451Q		SBF10019Z25B or V	
	2	2	DT-RFIL2-2-2UM					
		5	DT-RFIL2-2-5UM	HC2252FKP19H or Z	932692Q		SBF100118Z3B or V	
		8	DT-RFIL2-2-8UM	HC2252FKN19H or Z	932470		SBF100118Z5B or V	
		14	DT-RFIL2-2-14UM	HC2252FKS19H or Z	932410		SBF100118Z10B or V	
		25	DT-RFIL2-2-25UM	HC2252FKP19H or Z	933117Q			
25P	1	5	DT-25P-1-5UM					
		8	DT-25P-1-8UM					
		14	DT-25P-1-14UM		932624Q			
		25	DT-25P-1-25UM		922924			
	2	5	DT-25P-2-5UM					
		8	DT-25P-2-8UM					
		14	DT-25P-2-14UM		925836			
		25	DT-25P-2-25UM		925834			
25P	HC-1	5	DT-25PHC-1-5UM					
		14	DT-25PHC-1-14UM					

Donaldson

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
	HC-2	5	DT-25PHC-2-5UM					
		14	DT-25PHC-2-14UM					
30P	1	5	DT-30P-1-5UM					
		8	DT-30P-1-8UM					
		14	DT-30P-1-14UM					
		25	DT-30P-1-25UM					
	2	5	DT-30P-2-5UM					
		8	DT-30P-2-8UM					
		14	DT-30P-2-14UM					
		25	DT-30P-2-25UM					
	HC-1	5	DT-30PHC-1-5UM					
		14	DT-30PHC-1-14UM					
	HC-2	5	DT-30PHC-2-5UM					
		14	DT-30PHC-2-14UM					
31P		2	DT-31P-2UM					
		5	DT-31P-5UM		932634Q			
		8	DT-31P-8UM		932635Q			
		14	DT-31P-14UM		922961			
		25	DT-31P-25UM		907234			
61P		5	DT-61P-5UM		932640Q			
		8	DT-61P-8UM		932641Q			
		14	DT-61P-14UM		924589			
		25	DT-61P-25UM		907088			
015	PG015GH	5	DT-015-5UM					Mahle Pi2105
	PG015HH	8	DT-015-8UM					Mahle Pi5105
	PG015KH	14	DT-015-14UM					Mahle Pi3105
	PG015JH	25	DT-015-25UM					Mahle Pi4105
025	PG025GH	5	DT-025-5UM					Mahle Pi2108
	PG025HH	8	DT-025-8UM					Mahle Pi5108
	PG025KH	14	DT-025-14UM					Mahle Pi3108
	PG025JH	25	DT-025-25UM					Mahle Pi4108
030	PG030GH	5	DT-030-5UM					Mahle Pi2111
	PG030HH	8	DT-030-8UM					Mahle Pi5111
	PG030KH	14	DT-030-14UM					Mahle Pi3111
	PG030JH	25	DT-030-25UM					Mahle Pi4111
050	PG050GH	5	DT-050-5UM	HC2235FKP6	2150003BN			Mahle Pi2115
	PG050HH	8	DT-050-8UM	HC2235FKN6	2150006BN			Mahle Pi5115
	PG050KH	14	DT-050-14UM	HC2235FKS6				Mahle Pi3115
	PG050JH	25	DT-050-25UM	HC2235FKT6	21500025BN			Mahle Pi4115
080	PG080GH	5	DT-080-5UM	HC2235FKP10				Mahle Pi2130
	PG080HH	8	DT-080-8UM	HC2235FKN10				Mahle Pi5130
	PG080KH	14	DT-080-14UM	HC2235FKS10				Mahle Pi3130
	PG080JH	25	DT-080-25UM	HC2235FKT10				Mahle Pi4130
120	PG120GH	5	DT-120-5UM	HC2235FKP15	245000BN			Mahle Pi2145
	PG120HH	8	DT-120-8UM	HC2235FKN15				Mahle Pi5145
	PG120KH	14	DT-120-14UM	HC2235FKS15	2450010BN			Mahle Pi3145
	PG120JH	25	DT-120-25UM	HC2235FKTP15	2150025BN			Mahle Pi4145
K	9''	5	DT-HF4-9-5UM	HC9700FKP9H or Z	HF4L3VQ	50309D03BN	KZ1	

Donaldson.

Series	Description/ Length	Media µm	Donaldson Triboguard™	Pall	Parker	Hydac	Schroeder	Comments
K	9''	8	DT-HF4-9-8UM	HC9700FKN9H or Z	HF4L10VQ	50309D06BN	KZ3	
K	9''	14	DT-HF4-9-14UM	HC9700FKS9H or Z	HF4L15VQ	50309D12BN	KZ10	
K	9''	25	DT-HF4-9-25UM	HC9700FKT9H or Z	HF4L25VQ	50309D25BN	KZ25	
KK	18''	5	DT-HF4-18-5UM	HC9700FKP18H or Z	932677Q	50318D03BN	KKZ1	
KK	18''	8	DT-HF4-18-8UM	HC9700FKN18H or Z	932678Q	50318D06BN	KKZ3	
KK	18''	14	DT-HF4-18-14UM	HC9700FKS18H or Z	932679Q	50318D12BN	KKZ10	
KK	18''	25	DT-HF4-18-25UM	HC9700FKT18H or Z	931020Q	50318D25BN	KKZ25	
KKK	27''	5	DT-HF4-27-5UM	HC9700FKP27H or Z	933486Q		KKKZ1	
KKK	27''	8	DT-HF4-27-8UM	HC9700FKN27H or Z	933487Q		KKKZ3	
KKK	27''	14	DT-HF4-27-14UM	HC9700FKS27H or Z	933488Q		KKKZ10	
KKK	27''	25	DT-HF4-27-25UM	HC9700FKT27H or Z	933489Q		KKKZ25	
KX	9''	5	DT-HF4HC-9-5UM		932674Q	50309D03BH	KZX1	
KX	9''	14	DT-HF4HC-9-14UM		932676Q	50309D10BH	KZX10	
	6 X 18	2.5	DT-618-2UM	HC0101FKZ18H or Z			SBF-6000-18Z1B or V	
		5	DT-618-5UM	HC0101FKP18H or Z			SBF-6000-18Z3B or V	
		8	DT-618-8UM	HC0101FKN18H or Z			SBF6000-18Z5B or V	
		14	DT-618-14UM	HC0101FKS18H or Z			SBF-6000-18Z10B or V	
		25	DT-618-25UM	HC0101FKT18H or Z			SBF-6000-18Z25B or V	
	6 X 36	2.5	DT-636-2UM	HC0101FKZ36H or Z			SBF-6000-36Z1B or V	
		5	DT-636-5UM	HC0101FKP36H or Z			SBF-6000-36Z3B or V	
		8	DT-636-8UM	HC0101FKN36H or Z			SBF-6000-36Z5B or V	
		14	DT-636-14UM	HC0101FKS36H or Z			SBF-6000-36Z10B or V	
		25	DT-636-25UM	HC0101FKT36H or Z			SBF-6000-36Z25B or V	
A		5	DT-A-5UM				AZ1	
		8	DT-A-8UM				AZ5	
		14	DT-A-14UM				AZ10	
		25	DT-A-25UM				AZ25	

Donaldson

Service Indicator Options

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

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

Replacement Indicators Only

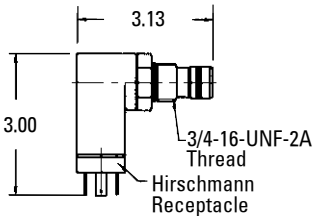
Part No.	Description
P567458	Visual/Electrical indicator with thermal lockout and surge, 35 psid/2.4 bar
P567459	Visual/Electrical indicator, with thermal lockout and surge 70 psid/4.8 bar
P567456	Pop-Up Visual Indicator, with thermal lockout and surge 35 psid/2.4 bar
P567457	Pop-Up Visual Indicator, 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

* Note: Above choices include indicator and mounting block.

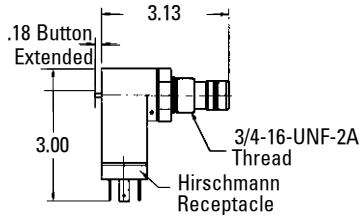
Differential Indicators and Switches

Electrical Indicators
(with aluminum electrical housing)

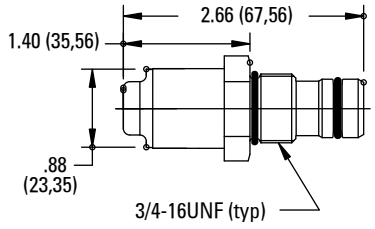
Electric ΔP indicator



Electric ΔP indicator with pop-up visual button and manual reset



Visual (mechanical) Indicators
(with auto reset pop-out button)



Donaldson

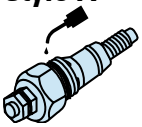
Electrical Service Indicators

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	FIK	at right
P173893	50 psi/ 345 kPa	DC 3-wire. Gold alloy contacts. Micro-processor 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. 250 VAC or 30 VDC max. 0.5A resistive, 02A inductive.	FPK02	page 103

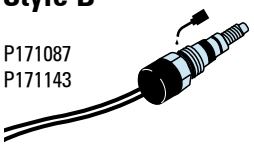
Style A

P162400
P163601
P163642
P163839
P165194
P167455



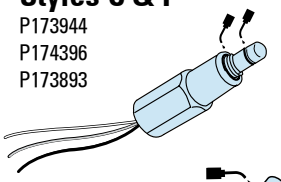
Style B

P171087
P171143



Styles C & F

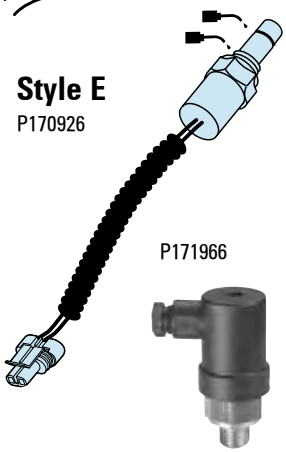
P173944
P174396
P173893



Style E

P170926

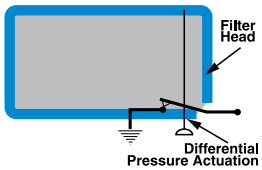
P171966



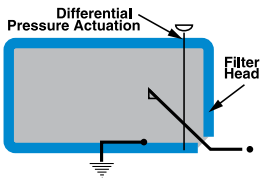
Electrical Schematics

Style A: Single Post DC Indicator
(Maximum: 200 mA DC @ 30 VDC)

P167455
P163839

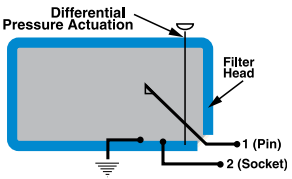


P162400
P163601
P163642
P165194

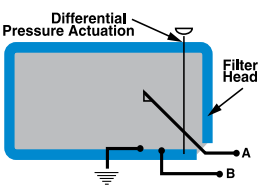


Style B: DC 2-Wire Indicator
(Maximum: 200 mA DC @ 30 VDC)

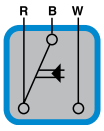
P171143



P171087

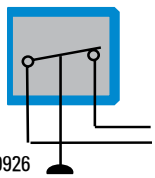


Style C, F: AC/DC 3-Wire Indicator
(Maximums: 2 amps @ 24 VDC or 2 amps @ 110 VAC)



P173944

Style E: DC 2-Wire Indicator
(Maximum: 100 mA DC @ 30 VDC)



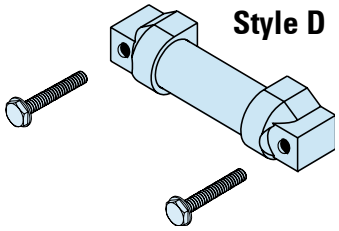
P170926

Donaldson

Visual Indicators & Pressure Gauges

Visual Indicators (non-Electric)

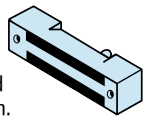
All non-electric models have a maximum operating temperature of 180°F/ 82°C.



Style D

P162642
P162694
P162696
P165965
P167580

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.

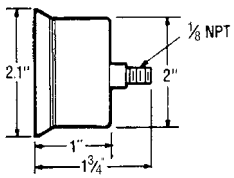


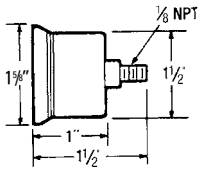
P171958

G ⅛

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 93
P165965	25 psi/345 kPa	HMK03	Style D
P166603	50 psi/345 kPa (reverse flow)	HPK04	page 125
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 103

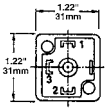
Part No.	Pressure Range	Function
P563296	0 to 100 PSI Numeric Scale	Return
P563297	0 to 100 PSI Color Coded (15 PSI)	Return
P563298	0 tp 100 PSI Color Coded (25 PSI)	Return
P563299	0 to -20 Hg	Suction
P563300	0 to 30 PSI Color Coded (15 PSI)	Return



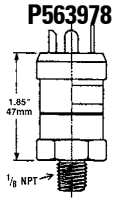


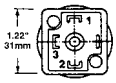
Pressure Gauges

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

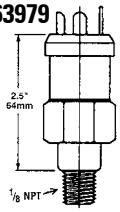


P563978





P563979



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

Part No.	Pressure Range	Function
P563978	5 to 30 PSI Field Adj.	Return
P563979	-5 to 15 in. Hg Field Adj.	Suction

P171956
for FIK series

-1 to +5 bar
14.5 to 72.5 psi
-100 to +500 kPa

P171953

G ⅛

Hydraulic Line Accessories

More of the hydraulic components you need are now available from the fluid power experts at Donaldson:

- 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

Donaldson is your one-stop shop. We also have reservoir accessories. See page 173 for our complete line of breathers, vents, diffusers, level gauges and much more.

Pressure Gauges

Description:

Stainless steel (304SS)
Phosphor bronze bourdon tube
Acrylic lenses
Built-in snubber
Glycerin Filled

Features

Donaldson 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

Pressure Range Options

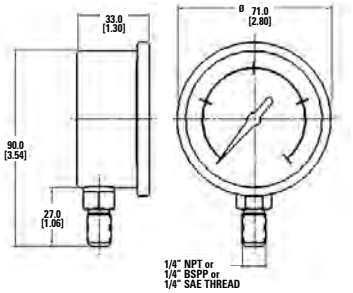
PGL-A	30 Hg-20 psi	0-30 in. Hg	0-30 psi	0-60 psi	0-100 psi	0-160 psi	0-300 psi	0-500 psi	0-600 psi	0-1000 psi	0-1500 psi	0-2000 psi	0-3000 psi	0-4000 psi	0-5000/345 psi	0-6000 psi	0-10000 psi
2½" Stem	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2½" SAE Stem							•		•	•	•	•		•	•		
2½" Panel	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	
4" Stem							•		•	•	•	•	•		•	•	•
4" Panel							•		•	•	•	•	•		•		•

Front Flange Option

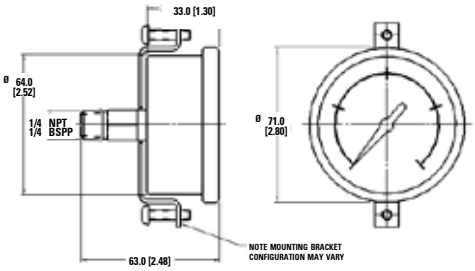
Donaldson Part No.	Description	Dial Size
P562699	PGL-A-63-FF	2-1/2" (63 mm)
P562671	PGL-A-100-FF	4" (100 mm)

2½" Gauges

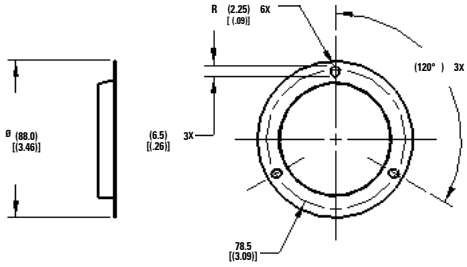
Stem Mount



Panel Mount



With Front Flange



2½" Dial, Stem Mount

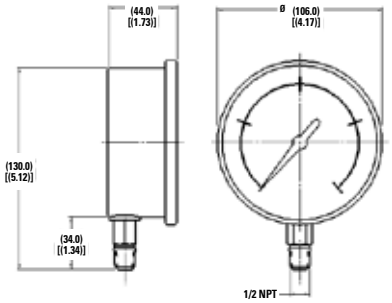
Donaldson Part No.	Description	Pressure Range (psi/bar)	Thread Type
P562718	PGL-A-63-N-B-30-CS	-30" Hg + 20/1	1/4" NPT
P562719	PGL-A-63-N-B-30-S	0 - 30/2	1/4" NPT
P562721	PGL-A-63-N-B-30-VS	0 - 30" Hg Vac	1/4" NPT
P562733	PGL-A-63-N-B-60-S	0 - 60/4	1/4" NPT
P562705	PGL-A-63-N-B-100-S	0 - 100/7	1/4" NPT
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" Dial, Panel Mount

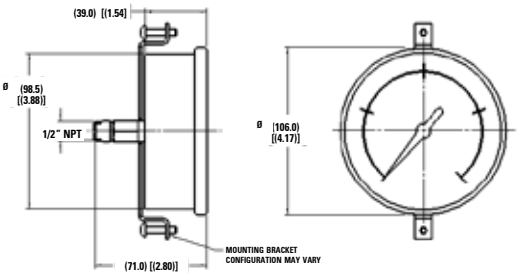
Donaldson Part No.	Description Range	Pressure Range (psi/bar)	Thread Type
P562720	PGL-A-63-N-B-30-VP	0 - 30" Hg Vac	1/4" NPT
P562732	PGL-A-63-N-B-60-P	0 - 60/4	1/4" NPT
P562704	PGL-A-63-N-B-100-P	0 - 100/7	1/4" NPT
P562708	PGL-A-63-N-B-160-P	0 - 160/11	1/4" NPT
P562716	PGL-A-63-N-B-300-P	0 - 300/20	1/4" 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" Gauges

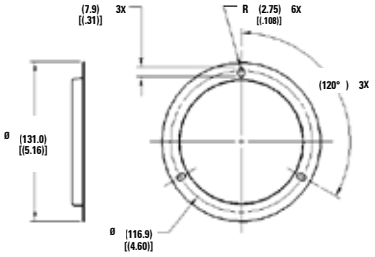
Stem Mount



Panel Mount



With Front Flange



4" Dial, 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-5000/345-S	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" Dial, 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-5000/345-P	0 - 5,000/350	1/2" NPT
P562672	PGL-A-100-N-B-10,000-P	0 - 10,000/700	1/2" NPT

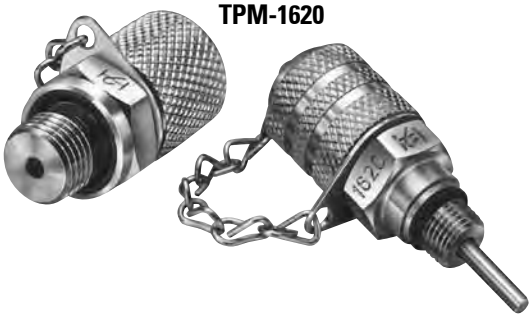
Test Points

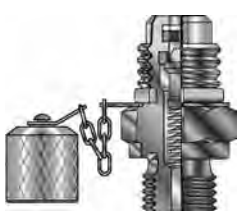
Description:

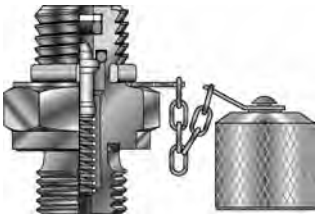
Working Pressure: 9000 *psi /630 bar*
Seals: Buna-N
Caps: Plastic or metal
Leak-free connection at full pressure

TPP-1215

TPM-1620







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 159.
For Test Point Hose Assemblies, see page 160.

Styles

- Pressure and/or Temperature

Applications

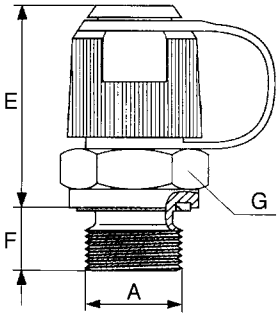
- Fluid or gas

Temperature Range

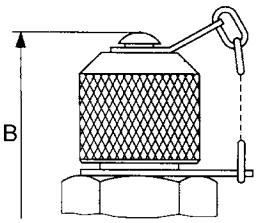
- Metal cap:
  -22°F to 248°F / -30°C to 120°C
- Plastic cap:
  -22°F to 212°F / -30°C to 100°C

TPM/TPP-1215 Assembly Views M12x1.5 Thread

Plastic Cap



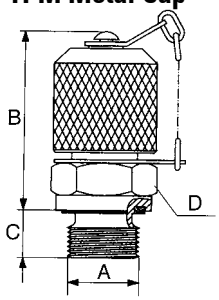
Metal Cap



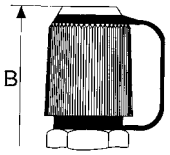
Donaldson Part No.	Description	Working Pressure psi/bar	A Thread Type	E (in./mm)	F (in./mm)	G (in./mm)	Cap	Comment
P563192	TPM-1215-04G	9000/630	1/4" BSPP, Form G	1.30/33	.33/8.5	0.55/14	Metal	
P563197	TPP-1215-02N	5800/400	1/8" NPTF	1.14/29	.47/12	0.55/14	Plastic	
P563193	TPM-1215-04N	9000/630	1/4" 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

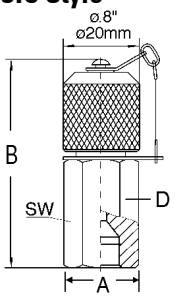
TPM Metal Cap



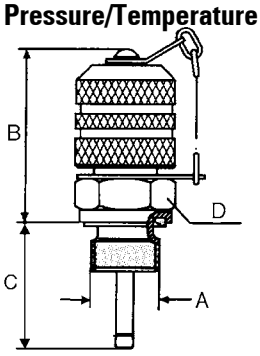
TPP Plastic Cap



JIC Style

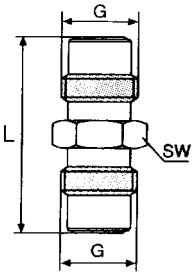


Pressure/Temperature



Donaldson Part No.	Description	Working Pressure psi/bar	A Thread Type	B (in./mm)	C (in./mm)	D (mm)	Cap	Comment
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



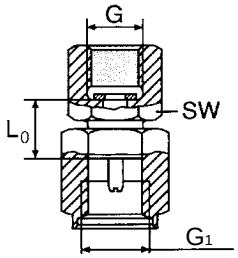
A variety of adapters to suit your application.

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

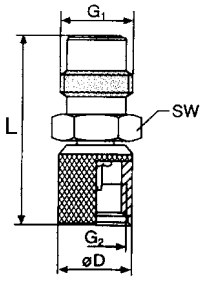
Direct Gauge Adapter

Donaldson Part No.	Description	G Int. Thread	G_1 Thread	psi/bar	L_0 (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



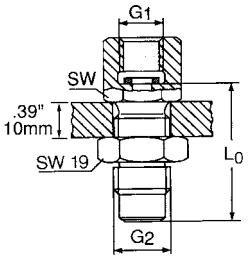
Series Converter

Donaldson Part No.	Description	G_1 Thread	G_2 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



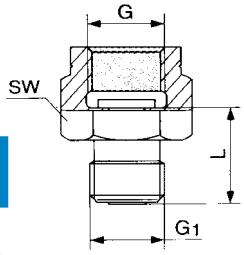
Bulkhead Gauge Adpater

Donaldson Part No.	Description	G_1 Thread	G_2 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_1 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

Description:

Working Pressure to 9000 *psi* / 630 bar

Temperature Range

-4°F to 212°F / -20°C to 100°C

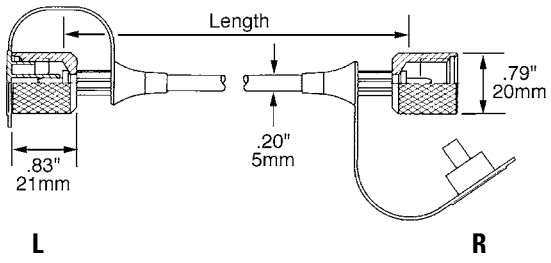
Length

12" to 180" / 305 to 4570

Features

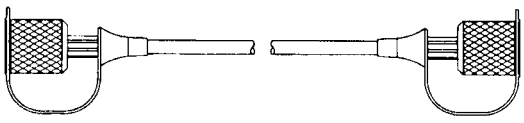
Donaldson test point hoses are made of Polyamide II core with polyester braid reinforcement and Polyamid II cover. They are suitable for use with petroleum-based fluids. Hoses are standard straight on both ends and include plastic dust caps.

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	Hose Pressure Rating (psi/bar)	Length (in/mm)
P563240	H-1215-B-0101-012	9000/630	12/305
P563243	H-1215-B-0101-024	9000/630	24/610
P563244	H-1215-B-0101-036	9000/630	36/915
P563245	H-1215-B-0101-048	9000/630	48/1220
P563246	H-1215-B-0101-072	9000/630	72/1830
P563247	H-1215-B-0101-096	9000/630	96/2440
P563248	H-1215-B-0101-120	9000/630	120/3050
P563249	H-1215-B-0101-180	9000/630	180/4570



1620 Series M16x2 Thread

Donaldson Part No.	Description	Hose Pressure Rating (psi/bar)	Length (in/mm)
P563250	H-1620-B-0101-012	9000/630	12/305
P563251	H-1620-B-0101-018	9000/630	18/460
P563252	H-1620-B-0101-024	9000/630	24/610
P563254	H-1620-B-0101-036	9000/630	36/915
P563255	H-1620-B-0101-048	9000/630	48/1220
P563256	H-1620-B-0101-072	9000/630	72/1830
P563257	H-1620-B-0101-096	9000/630	96/2440
P563259	H-1620-B-0101-120	9000/630	120/3050
P563260	H-1620-B-0101-144	9000/630	144/3660
P563261	H-1620-B-0101-180	9000/630	180/4570

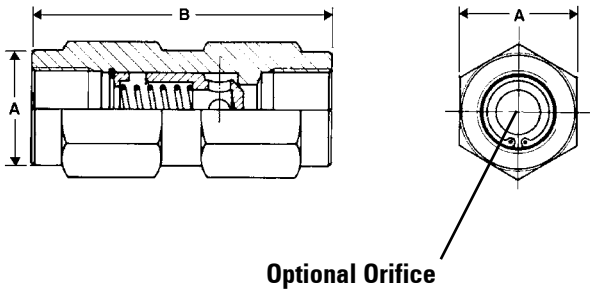
In-Line Check Valves

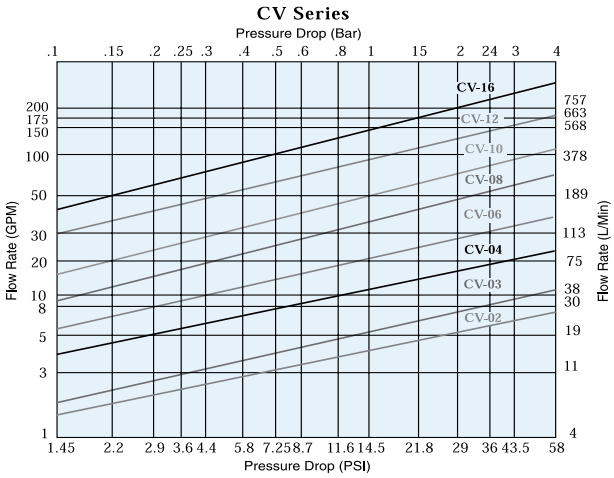
Working Pressures to: *5700 psi/393 bar*

Flow Ranges to: *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 charts are based on Hydraulic Oil 100 SUS, S.G. = 0.86

Sizes

- ¼", 3/8", ½", ¾", 1", 1¼", 1½" 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 Valves

Donaldson Part No.	Description	Max Working Pressure (psi/bar)	Max. Rated Flow Flow (gpm/lpm)	Opening Pressure (psi/bar)	Port	A (in./mm)	B (in./mm)
P562297	CV-02P-5	5700/393	6/23	5/0.34	1/4" NPT	0.75/19	2.17/55
P562298	CV-02P-65	5700/393	6/23	65/4.5	1/4" NPT	0.75/19	2.17/55
P562299	CV-02S-5	5700/393	6/23	5/0.34	#4 SAE	0.75/19	2.17/55
P562301	CV-03P-5	5700/393	10/38	5/0.34	3/8" NPT	0.98/25	2.68/68
P562302	CV-03P-65	5700/393	10/38	65/4.5	3/8" NPT	0.98/25	2.68/68
P562303	CV-03S-5	5700/393	10/38	5/0.34	#6 SAE	0.75/19	2.29/58
P562305	CV-04P-5	5700/393	16/60	5/0.34	1/2" NPT	1.06/27	2.95/75
P562306	CV-04P-65	5700/393	16/60	65/4.5	1/2" NPT	1.06/27	2.95/75
P562307	CV-04S-5	5700/393	16/60	5/0.34	#8 SAE	0.98/25	2.72/69
P562308	CV-04S-65	5700/393	16/60	65/4.5	#8 SAE	0.98/25	2.72/69
P562309	CV-06P-5	5700/393	25/94	5/0.34	3/4" NPT	1.38/35	3.48/88
P562311	CV-06P-65	5700/393	25/94	65/4.5	3/4" NPT	1.38/35	3.48/88
P562312	CV-06S-5	5700/393	25/94	5/0.34	#12 SAE	1.38/35	3.48/88
P562313	CV-06S-65	5700/393	25/94	65/4.5	#12 SAE	1.38/35	3.48/88
P562314	CV-08P-5	5000/345	45/169	5/0.34	1" NPT	1.61/41	4.33/110
P562316	CV-08P-65	5000/345	45/169	65/4.5	1" NPT	1.61/41	4.33/110
P562317	CV-08S-5	5000/345	45/169	5/0.34	#16 SAE	1.61/41	4.33/110
P563307	CV-08S-65	5000/345	45/169	65/4.5	#16 SAE	1.61/41	4.33/110
P562319	CV-10P-5	5000/345	95/357	5/0.34	1-1/4" NPT	2.16/55	4.72/120
P562320	CV-10P-65	5000/345	95/357	65/4.5	1-1/4" NPT	2.16/55	4.72/120
P562321	CV-10S-5	5000/345	95/357	5/0.34	#20 SAE	2.16/55	4.72/120
P562322	CV-10S-65	5000/345	95/357	65/4.5	#20 SAE	2.16/55	4.72/120
P562323	CV-12P-5	5000/345	130/489	5/0.34	1-1/2" NPT	2.56/65	5.43/138
P562324	CV-12P-65	5000/345	130/489	65/4.5	1-1/2" NPT	2.56/65	5.43/138
P562325	CV-12S-5	5000/345	130/489	5/0.34	#24 SAE	2.56/65	5.43/138
P562326	CV-12S-65	5000/345	130/489	65/4.5	#24 SAE	2.56/65	5.43/138
P562327	CV-16P-5	4500/310	200/752	5/0.34	2" NPT	2.56/65	5.43/138
P562328	CV-16P-65	4500/310	200/752	65/4.5	2" NPT	2.56/65	5.43/138

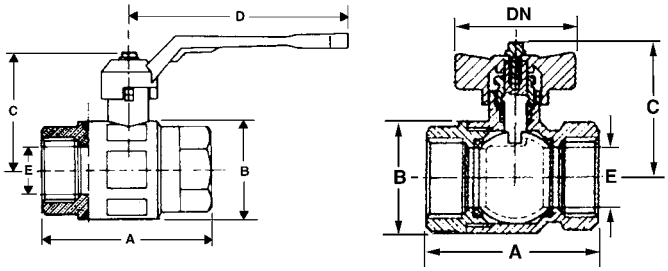
Ball Valves - Low Pressure

Description:

Hot pressed brass body and ball OT 58
Materials (ball and body): BV Series
chromium plated
Steel handle
Teflon seals (ball and stem)

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 ¼" 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

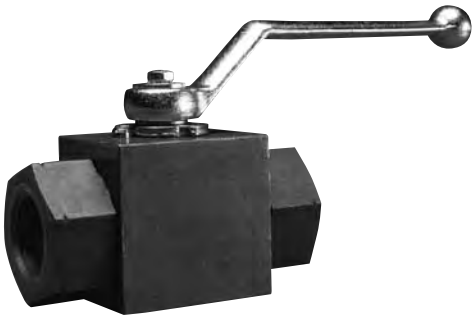
Replacement handles

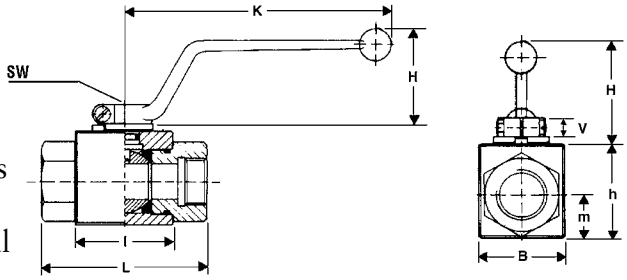
Donaldson Part No.	Description	Handle Style	Fits Valve Size
P562353	BVH-468	Standard	04-N, 06-N, 08-N
P562354	BVH-468-T	T Handle	04-N, 06-N, 08-N
P562348	BVH-1216	Standard	12-N, 16-N
P562349	BVH-1216-T	T Handle	12-N, 16-N
P562350	BVH-20	Standard	20-N
P562351	BVH-2432	Standard	24-N, 32-N
P562352	BVH-40	Standard	40-N
P562355	BVH-4864	Standard	48-N, 64-N

Ball Valves - Medium/High Pressure

Description:

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





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 -22ºF to 212ºF / -30ºC to 100ºC.

Medium Duty Ball Valves - MBV

Donaldson Part No.	Description	Port Thread	Pressure (psi/bar)	L (in./mm)	l (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 - HBV

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

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

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

Lock Device Kits

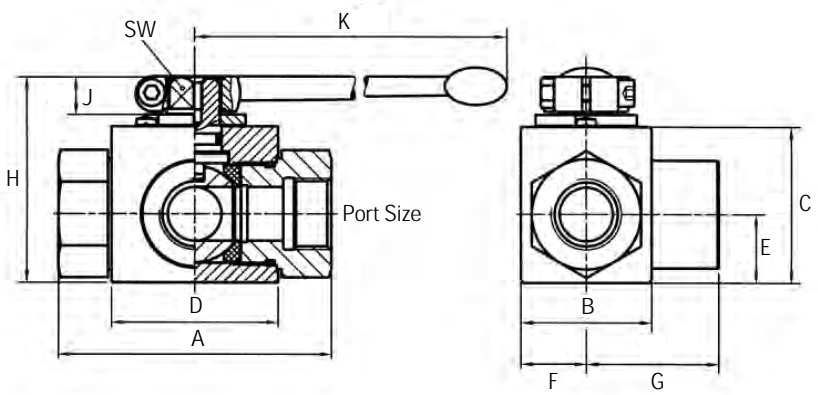
Donaldson Part No.	Description	Valve Size
P562332	LD-1	04, 06, 08
P562335	LD-2	12, 16
P562340	LD-3	20, 24, 32

For use on MBV, HBV and 3W-HBV

Three-Way Selector Ball Valve

Description:

Maximum pressure 7250 *psi* / 500 bar
Steel construction
Operating temperature
-22°F to 212°F / -30°C to 100°C

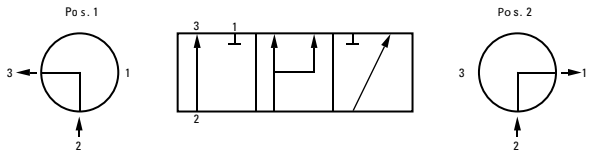


Donaldson Part No.	Description	Port Size	Max Pressure	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G (in./mm)	H (in./mm)	J (in./mm)	K (in./mm)	SW (in./mm)
P562342	3W-HBV-08-N	1/2" NPT	7250 psi 50000	4.09 104	1.50 38	1.57 40	1.89 48	0.75 19	0.69 17.5	1.63 41.5	2.13 54	0.43 11	4.53 115	0.3 9
P562344	3W-HBV-12-N	3/4" NPT	4500 psi 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 psi 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 psi 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	5000psi 34500kPa	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 psi 34500kPa	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

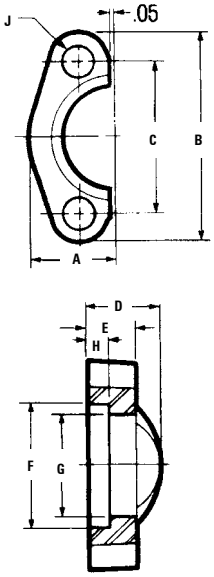


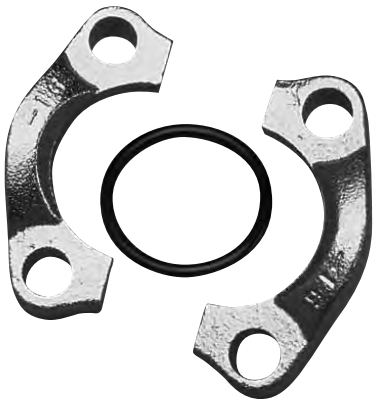
Split Flanges

Description:

Code 61 and Code 62
BunaN O-Ring

Each kit includes:
2 split flange halves
4 hex head mounting bolts and lockwashers
1 BunaN O-Ring





Code 61

Donaldson Part No.	Desc.	Flange Size (in./mm)	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)	Mounting Hardware O-Ring	Mounting Hardware Hex Head Cap Screw	Maximum Working Pressure
P563042	L-12SF-3	0.75 19	0.98 25	2.56 65	1.875 48	0.88 22	0.56 14	1.531 39	1.265 32	0.245 6	0.406 10	214	3/8"-16x11/4	5000 34500kPa
P563044	L-16SF-3	1.00 25	1.11 28	2.75 70	2.062 52	0.94 24	0.62 16	1.781 45	1.515 38	0.295 7	0.406 10	219	3/8"-16x11/4	5000 34500kPa
P563047	L-20SF-3	1.25 32	1.39 35	3.12 79	2.312 59	0.88 22	0.56 14	2.031 52	1.720 44	0.295 7	0.469 12	222	7/16"-14x11/2	4000 psi 27580 kPa
P563050	L-24SF-3	1.50 38	1.58 40	3.69 94	2.750 70	1.00 25	0.62 16	2.406 61	2.000 51	0.295 8	0.531 13	225	1/2"-13x11/2	3000 psi 20685 kPa
P563053	L-32SF-3	2.00 51	1.86 47	4.00 102	3.062 78	1.03 26	0.62 16	2.844 72	2.470 63	0.355 9	0.531 13	228	1/2"-13x11/2	3000 psi 20685 kPa
P563056	L-40SF-3	2.50 64	2.09 53	4.50 114	3.500 89	1.50 38	0.75 19	3.344 85	2.950 75	0.355 9	0.531 13	232	1/2"-13x13/4	2500 psi 17240 kPa

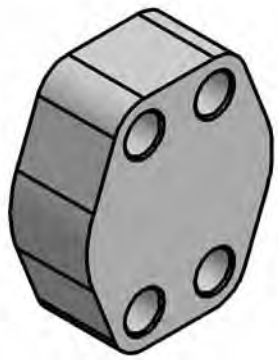
Code 62

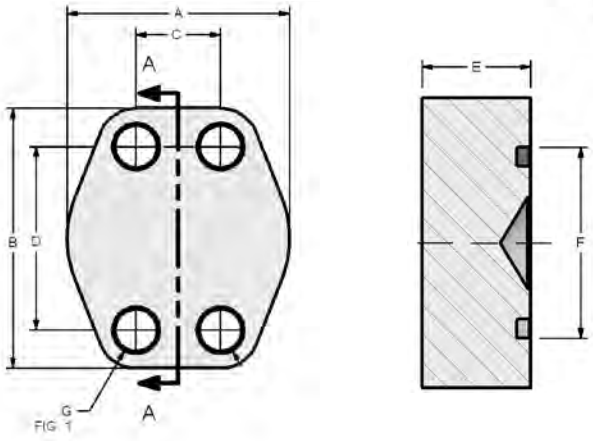
Donaldson Part No.	Desc.	Flange Size (in./mm)	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G (in./mm)	H (in./mm)	J (Dia.) (in./mm)	Mounting Hardware O-Ring	Mounting Hardware Hex Head Cap Screw	Maximum Working Pressure
P563043	L-12SFX-6	0.75 19	1.14 29	2.81 71	2.000 51	1.12 28	0.75 19	1.656 42	1.280 33	0.325 8	0.406 10	214	3/8"-16x11/2	6000 psi 41370kPa
P563046	L-16SFX-6	1.00 25	1.33 34	3.19 81	2.250 57	1.31 33	0.94 24	1.906 48	1.530 39	0.355 9	0.469 12	219	7/16"-14x13/4	6000 psi 41370kPa
P563049	L-20SFX-6	1.25 32	1.48 38	3.75 95	2.625 67	1.50 38	1.06 27	2.156 55	1.750 44	0.385 10	0.531 13	222	1/2"-13x13/4	6000 psi 41370kPa
P563051	L-24SFX-6	1.50 38	1.83 46	4.44 113	3.125 79	1.69 43	1.19 30	2.531 64	2.030 52	0.475 12	0.656 17	225	5/8"-11x21/4	6000 psi 41370kPa
P563054	L-32SFX-6	2.00 51	2.20 56	5.25 133	3.812 97	2.06 52	1.44 37	3.156 80	2.660 68	0.475 12	0.781 20	228	3/4"-10x23/4	6000 psi 41370kPa

Blanking Flanges

Description:

Code 61 and 62
O-Ring





Blanking Flanges, Code 61

Donaldson Part No.	Desc.	Pad Size	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G (in./mm)	Mounting Hardware 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

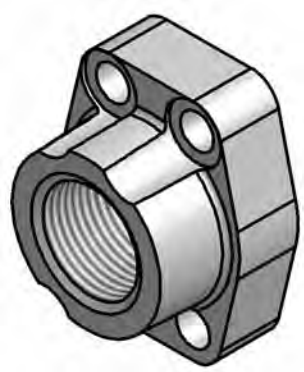
Blanking Flanges, Code 62

Donaldson Part No.	Desc.	Pad Size	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G (in./mm)	Mounting Hardware 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

Description:

Code 61 and 62
NPT Thread
BunaN O-Ring
Mounting hardware and O-Ring included on O-Ring models
Maximum temperature with O-Ring 250°F / 121°C



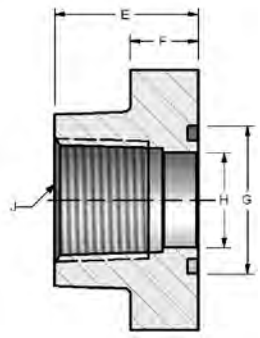
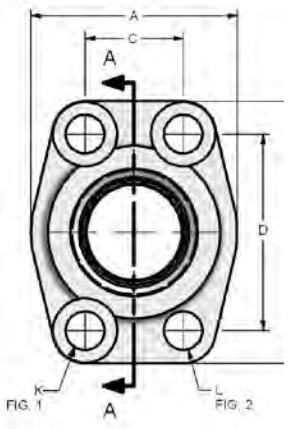


Figure 1



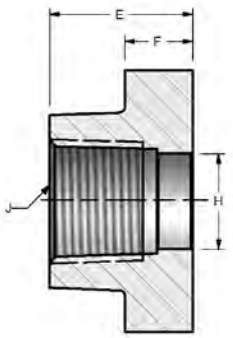


Figure 2

4-Bolt Threaded Flanges

Code 61 NPTF Thread, O-Ring (Figure 1)

Donaldson Part No.	Desc.	Port Size	Pad Size	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 NPTF	K (dia.) Drill	Mounting Hardware O-Ring	Mounting Hardware 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	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	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	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	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	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	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	0.656 17	237	5/8"-11 x 2.50

4-Bolt NPTF Threaded Flange

Code 61 NPTF Thread, Flat Face (Figure 2)

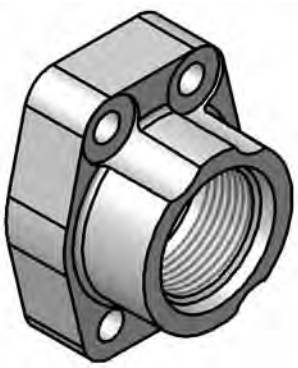
Donaldson Part No.	Description	Port Size	Pad Size	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G (in./mm)	H (in./mm)	J NPTF	L Tap UNC-2B
P563161	LIC-12-12P-30	0.75 19	0.75 19	1.97 50	2.56 65	0.875 22	1.875 48	1.42 36	0.71 18	1.250 32	0.752 19	3/4″-14	3/8″-16
P563163	LIC-16-16P-30	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	3/8″-16
P563166	LIC-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	7/16″-14
P563169	LIC-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	1/2″-13
P563171	LIC-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	1/2″-13

4-Bolt Threaded Flanges

Code 62 NPTF Thread, O-Ring (Figure 1)

Donaldson Part No.	Description	Port Size	Pad Size	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 NPTF	K (Dia.) Drill	Mounting Hardware O-Ring	Mounting Hardware SHCS
P563094	LI-16-16P-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	1-11.5	0.492 12	219	7/16″-14 x 1.50
P563101	LI-20-20P-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	1-1/4-11.5	0.531 13	222	1/2″-13 x 1.50
P563108	LI-24-24P-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	1-1/2-11.5	0.656 17	225	5/8″-11 x 1.75

4-Bolt SAE Threaded Flange



Description:

Code 61 and 62
SAE Straight Thread
BunaN O-Ring
Mounting hardware and O-Ring included on O-Ring models
Maximum temperature with O-Ring 250°F/ 121°C

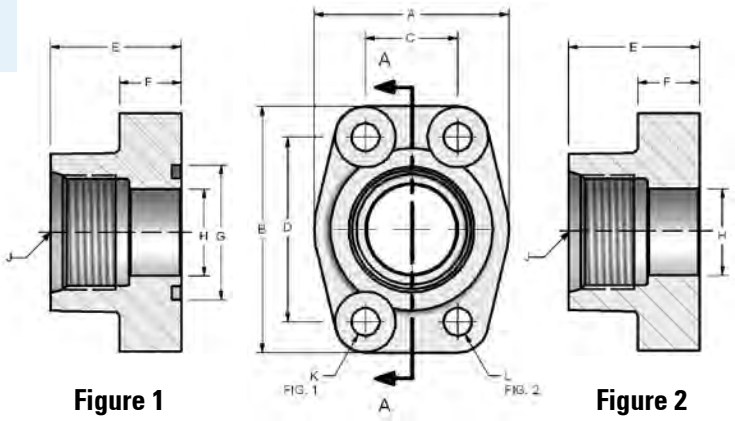


Figure 1 Figure 2

4-Bolt Threaded Flanges

Code 61 Straight Thread, O-Ring (Figure 1)

Donaldson Part No.	Desc.	Port Size	Pad Size	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 UN/UNF-2B	K (Dia.) Drill	Mounting Hardware O-Ring	SHCS
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	1.0/25	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.	Desc.	Port Size	Pad Size	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 UN/UNF-2B	L Tap UNC-2B
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.	Desc.	Port Size	Pad Size	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 UN/UNF-2B	K (Dia.) Drill	Mounting Hardware O-Ring	SHCS
P563091	LI-12-12S-60	0.75/19	0.75/19	2.17/55	2.80/71	0.937/24	2.000/51	1.38/35	0.83/21	1.250/32	0.752/19	1 1/16"-12	0.406/10	214	3/8"-16 x 1.25
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

Description:

Code 61 and 62

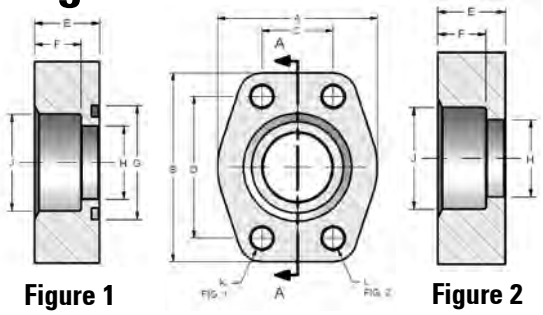
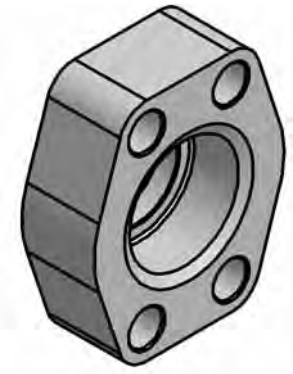


Figure 1

Figure 2



Code 61, O-Ring (Figure 1)

Donaldson Part No.	Desc.	Pipe Size	Pad Size	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)	Mounting Hardware 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	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)	L UNC-2B
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

Hydraulic Reservoir Accessories

When it comes to designing a fluid power system, look to Donaldson for reliable filters and a wide selection of accessories. Everything you need for your reservoir—breathers, vents, strainers, diffusers, gauges and more. All available from Donaldson, your one stop shop.

Suction Strainers

- Line Mount
- Tank Mount

Diffusers

- Line Mount
- Tank Mount

Level Gauges

Sight Gauges

Filler Breather Assemblies

Breathers

We have hydraulic line accessories, too. See pages 154-172 for test points, pressure gauges, valves and port flanges.

See pages 151-153 for our selection of filter service indicators.

Suction Strainers

Flow Range: 0-300 *gpm* / 0-1,140 *lpm*

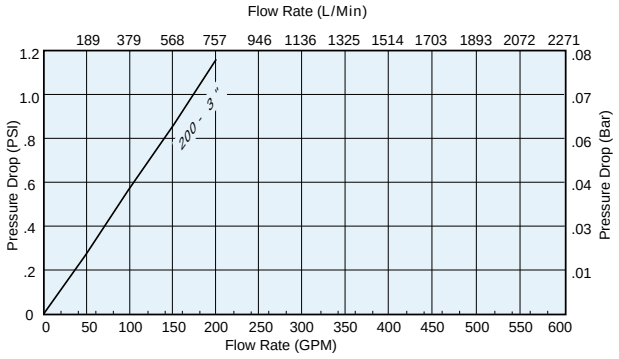
Outlet Port Size: 3/8" NPT to 4" NPT

Stainless Steel Mesh
Steel or nylon fittings
Operating temperatures:
Steel fitting to 250ºF / 121ºC
Nylon fitting to 210ºF / 100ºC
Relief valve available

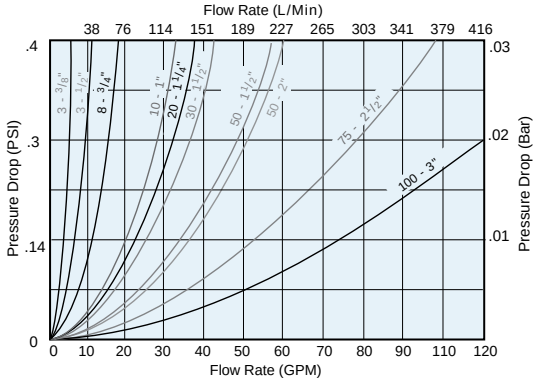
Features

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.

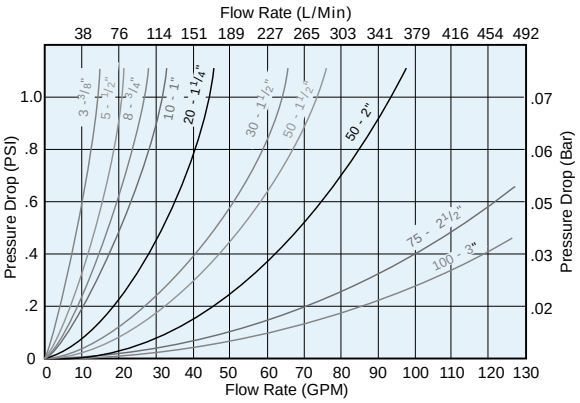
SEC 200-300

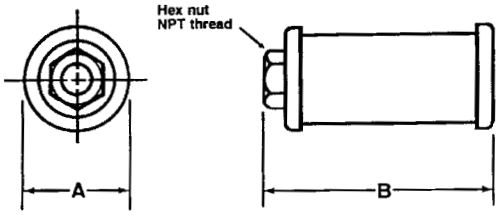


PEC 3-100



SEH/SEC 3-100





Note: PEC and SEH model strainers have hex nut style outlet fittings (pictured at top of page). SEC model strainers have pipe coupling style (round) outlet fittings. All styles have NPT threads inside.

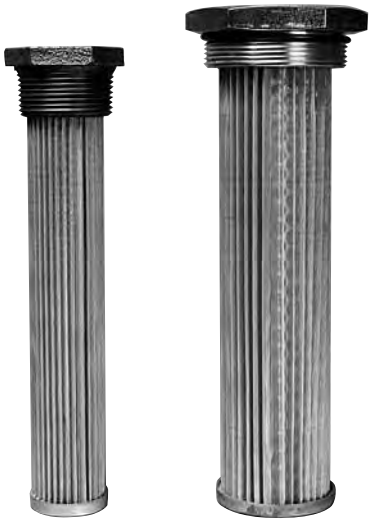
	Donaldson Part No.	Description	Relief Valve Setting	Outlet Pipe Size	Wire Mesh Size	Dim. A (in./mm)	Dim. B (in./mm)	Screen Area (sq. in./sq. cm)	Max. Flow (gpm/lpm)
NYLON FITTING	P562235	PEC-3-3/8-100	n/a	3/8" NPT	100 µm	1.9/48	2.7/69	20/129	3/11
	P562240	PEC-5-1/2-100	n/a	1/2" NPT	100 µm	1.9/48	4.3/109	25/161	5/19
	P562245	PEC-8-3/4-100	n/a	3/4" NPT	100 µm	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 µm	2.7/69	4.3/109	40/258	8/30
	P562244	PEC-8-1-100	n/a	1" NPT	100 µm	2.7/69	4.3/109	40/258	8/30
	P562226	PEC-10-1-100	n/a	1" NPT	100 µm	2.7/69	5.6/142	70/452	10/38
	P562227	PEC-10-1-100-RV3	3 psid/0.2 bar	1" NPT	100 µm	2.7/69	5.6/142	70/452	10/38
	P562228	PEC-20-1.1/4-100	n/a	1-1/4" NPT	100 µm	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 µm	3.4/86	5.6/142	128/826	20/75
	P562231	PEC-20-1.1/4-200	n/a	1-1/4" NPT	200 µm	3.4/86	5.6/142	128/826	20/75
	P562232	PEC-30-1.1/2-100	n/a	1-1/2" NPT	100 µm	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 µm	3.4/86	5.6/142	128/826	30/113
	P562236	PEC-50-1.1/2-100	n/a	1-1/2" NPT	100 µm	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 µm	4/102	8/203	200/1290	50/188
	P562238	PEC-50-2-100	n/a	2" NPT	100 µm	4/102	10.4/264	200/1290	50/188
	P562239	PEC-50-2-100-RV3	3 psid/0.2 bar	2" NPT	100 µm	4/102	10.4/264	200/1290	50/188
	P562242	PEC-75-2.1/2-100	n/a	2-1/2" NPT	100 µm	5.2/132	8.5/216	316/2039	75/282
	P562243	PEC-75-2.1/2-100-RV3	3 psid0.2 bar	2-1/2" NPT	100 µm	5.2/132	8.5/216	316/2039	75/282
	P562223	PEC-100-3-100	n/a	3" NPT	100 µm	5.2/132	10.9/277	379/2445	100/376
	P562224	PEC-100-3-100-RV3	3 psid/0.2 bar	3" NPT	100 µm	5.2/132	10.9/277	379/2445	100/376
	P562225	PEC-100-3-100-SST	n/a	3" NPT	100 µm	5.2/132	10.9/277	379/2445	100/376
STEEL FITTING	P562221	SEH-3-3/8-100	n/a	3/8" NPT	100 µm	1.9/48	2.5/64	34/219	3/11
	P169012	SEH-5-1/2-100	n/a	1/2" NPT	100 µm	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 µm	2.7/69	3.1/79	62/400	5/19
	P169013	SEH-8-3/4-100	n/a	3/4" NPT	100 µm	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 µm	2.63/67	3.55/90	68/439	8/30
	P169014	SEH-10-1-100	n/a	1" NPT	100 µm	2.63/67	5.35/136	110/710	10/38
	P173911	SEH-10-1-100-RV3	3 psid/0.2 bar	1" NPT	100 µm	2.63/67	5.35/136	110/710	10/38
	P169015	SEH-20-1.1/4-100	n/a	1-1/4" NPT	100 µm	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 µm	3.38/86	6.85/174	162/1045	20/75
	P169016	SEH-30-1.1/2-100	n/a	1-1/2" NPT	100 µm	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 µm	3.38/86	8.01/203	225/1452	30/113
	P169017	SEH-50-1.1/2-100	n/a	1-1/2" NPT	100 µm	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 µm	3.94/100	9.8/249	340/2194	50/188
	P562222	SEH-50-1.1/2-60	n/a	1-1/2" NPT	60 µm	3.94/100	9.8/249	340/2194	50/188
	P169018	SEH-50-2-100	n/a	2" NPT	100 µm	3.94/100	9.8/249	340/2194	50/188
	P173915	SEH-50-2-100-RV3	3 psid/0.2 bar	2" NPT	100 µm	3.94/100	9.8/249	340/2194	50/188
	P169019	SEC-75-2.1/2-100	n/a	2-1/2" NPT	100 µm	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 µm	5.12/130	10.1/257	400/2581	75/282
	P169020	SEC-100-3-100	n/a	3" NPT	100 µm	5.12/130	11.78/299	500/3226	100/376
	P173917	SEC-100-3-100-RV3	3 psid/0.2 bar	3" NPT	100 µm	5.12/130	11.78/299	500/3226	100/376
	P562211	SEC-100-3-60	n/a	3" NPT	60 µm	5.12/130	11.78/299	500/3226	100/376
	P562212	SEC-100-3-60-RV3	3 psid/0.2 bar	3" NPT	60 µm	5.12/130	11.78/299	500/3226	100/376
	P562213	SEC-200-3-100	n/a	3" NPT	100 µm	8.1/206	11.3/287	965/6226	200/752
	P562214	SEC-300-4-100	n/a	4" NPT	100 µm	8.1/206	15/381	1370/8839	300/1128
	P171861	FIOA 20	n/a	G3/8"	90 µm	2.05/52	3.03/77	29/184	2.7/10
	P171869	FIOA 50	n/a	G¾"	90 µm	2.95/75	3.74/95	54/348	6.6/25
	P171877	FIOA 90	n/a	G1"	90 µm	2.95/75	5.55/141	86/554	12.0/45
	P171885	FIOA 130	n/a	G1¼"	90 µm	3.74/95	7.24/184		17.3/65
	P171889	FIOA 175	n/a	G1½"	90 µm	5.51/140	4.45/113	183/1178	22.6/85

Tank Mounted Strainers

Flow Range: 0-100 *gpm* / 0-380 *lpm*

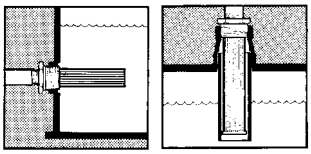
Outlet Port Size: 3/8" NPT to 1¼" NPT
or SAE-8 to SAE-20

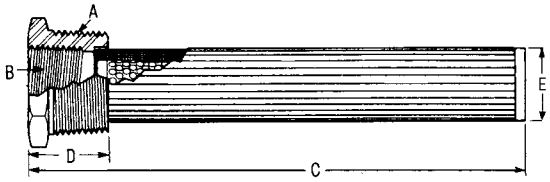
140 Micron Stainless Steel Mesh
Steel SAE bushing
Cast iron NPT bushing
Operating temperatures to 250°F / 121°C
Relief valve available



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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	3" NPT	2" NPT	9.7/246	1.7/43	3/76	260/1677	50/188
P563306	TM-100-100	n/a	100 µm	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 µm	4" NPT	3" NPT	11.3/287	1.8/46	4/102	315/2032	100/376
P562253	STM-5-100	n/a	100 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	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 µm	2-1/2" – 12 UN	1-5/8" – 12 UN	9.04/230	1.35/34	2.12/54	125/806	25/94

Diffusers

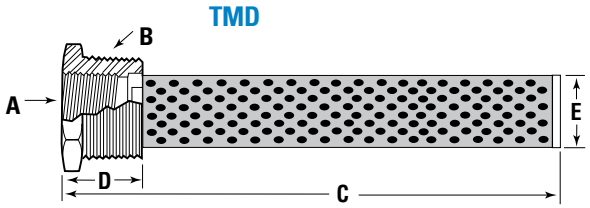
Description:

Perforated Steel
Cast iron bushings (TMD-tank mount)
Zinc-plated steel (DFD-return line)
Operating temperatures to 250ºF / 121ºC

Flow Range: 0-450 *gpm* / 0-1,710 *l*pm

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.

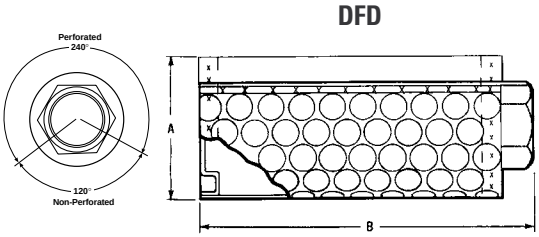


TMD - Tank Mount Diffusers

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

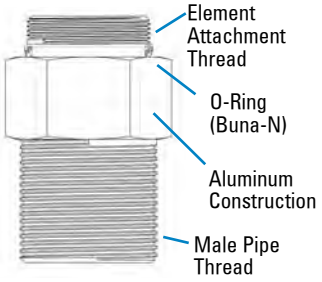


Breathers

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



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	-	P562628	P564424
MBF-3-M-P20	-	P173545	P550386
MBF-10-M-P20	-	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
P562198	P173544	10 micron nom.	5.4/137	3.7/94	23/172/647
P565069	P173544	10 micron nom.	7.9/200	3.7/94	28/216/812
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. Patented Donaldson T.R.A.P. technology eliminates moisture condensation in hydraulic system reservoirs. Moisture is prevented from entering and is actually "pumped" out with each flow cycle.

- **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_2O/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%

Housing Weight
- 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

T.R.A.P.™ Moisture Adsorbing Breathers & Mini Breathers

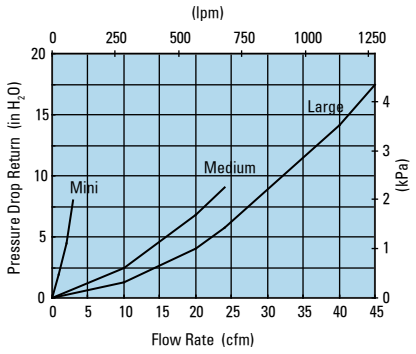
Self-Regenerating Breather

Donaldson Part Number	Description	Connection	Maximum Flow (cfm)	Indicator	Moisture Removal	Oil/Splash Containment	Diameter (in./mm)	Total Height (in./mm)
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	4.64/118
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	4.64/118
P565857	Medium-Steel	3/4" 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	3/4" 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	1/4" 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	1/4" 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 3/4"x1" NPT reducer)								
P566168	Mechanical Indicator Kit	1" NPT coupling		20" H2O/5 kPa trip point			n/a	2.41/61.2
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

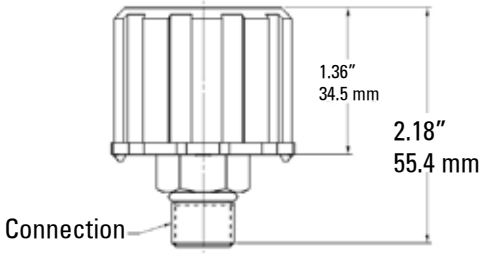
T.R.A.P. Breather Sizing

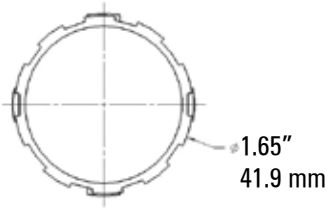
Trap Model	Hydraulic System (gal/l)	In-plant Lube (gal/l)	Outside (gal/l)
Standard	100/375	500/1875	250/938
Metal	40/150	200/750	100/375
Mini	4/15	20/75	10/38

T.R.A.P. Performance Data



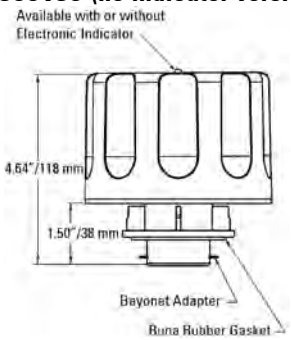
Mini-Breather Specifications



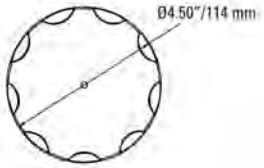


T.R.A.P.™ Breather Specifications

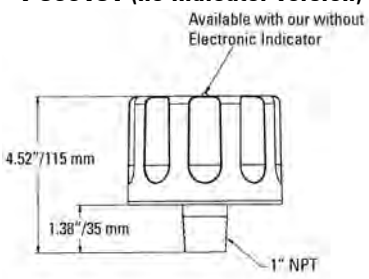
P565616
P566156 (no indicator version)



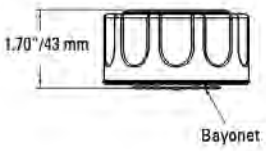
Top View



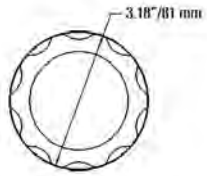
P564669
P566151 (no indicator version)



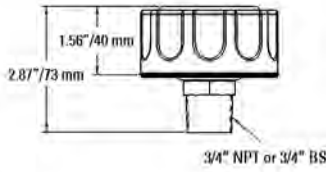
P565858



Top View



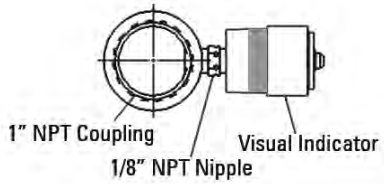
P565857 (3/4" NPT version)
P566037 (3/4" BSP version)

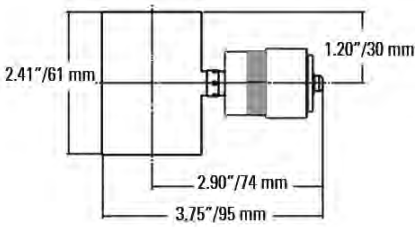


Mechanical Indicator Kit P566168

Suitable for use with P566151 and P565857*

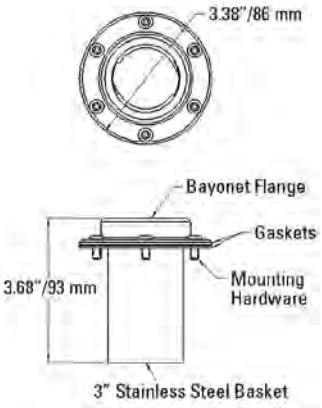
*Requires additional 3/4" x 1" reducer bushing (supplied by customer)





Bayonet Style Filler Basket/Flange Kits (Use with any bayonet style T.R.A.P. Breather)

P566321



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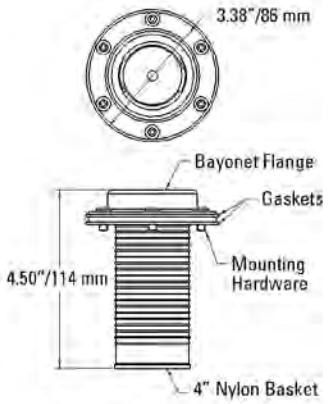
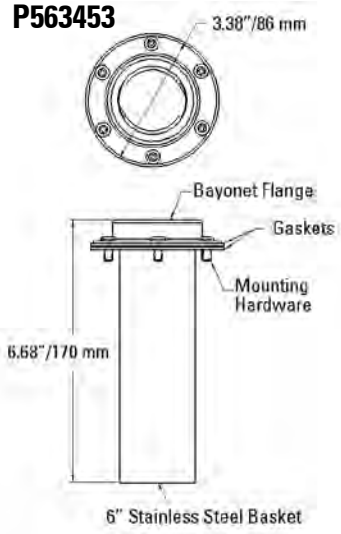


P563453



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 ingression of humidity, thereby, 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?

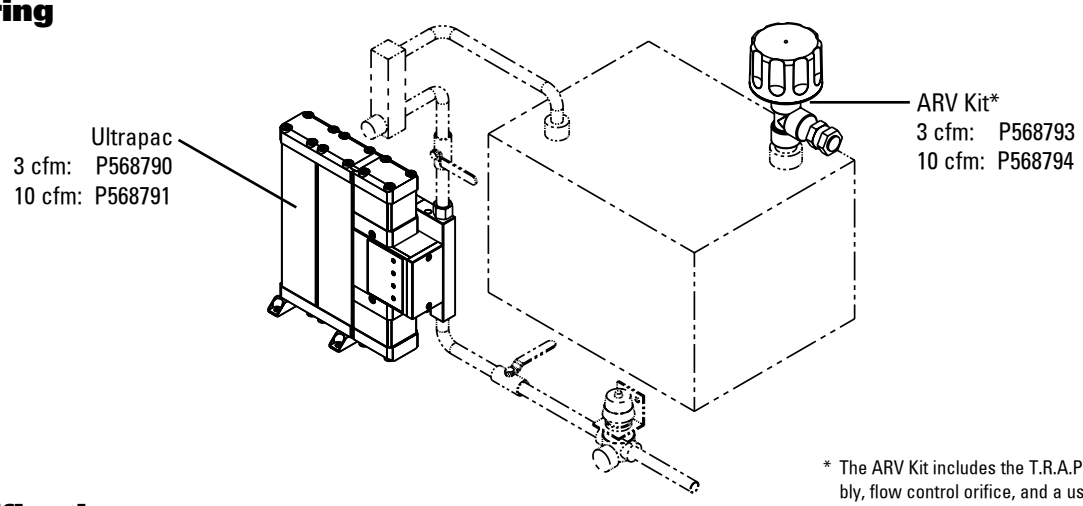
Water is a frequent and damaging contaminant in hydraulic and lubrication systems, and water contamination causes a host of problems including corrosion, component seizure, microbial growth, additive dumping, and accelerated oil oxidation. The ARV will help prevent the chain of damage caused by water 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, flow control orifice, and a user's manual.

Specifications

Ultrapac

Part Number	Flow Rate (scfm)	Recommended for Reservoir Size (gallons/liters)	NPTF Connection (inches)	Dimensions (in./mm)			Weight (lbs/kg)
				Height	Width	Depth	
P568790	3	up to 600/2271	1/2	13.7/348	11.8/300	4.7/119	15/7
P568791	10	up to 2000/7570	1/2	34.8/884	11.8/300	4.7/119	33/15

- 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
- Maximum Oil Content in Air = 3ppm

ARV Kit** Breather Assembly

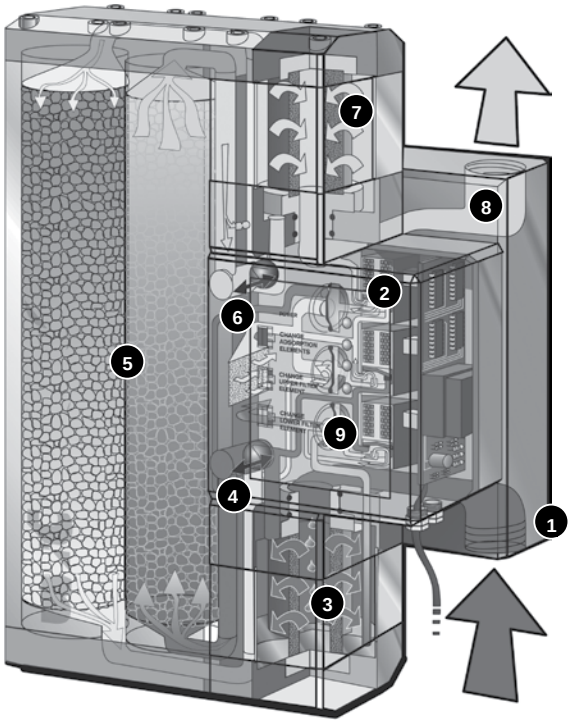
Part Number	Flow Rate (scfm)	Recommended for Reservoir Size (gallons/liters)	NPTM Connection (inches)	T.R.A.P. Breather Assembly (in./mm)		
				Height	Width	Depth
P568793	3	up to 600/2271	1	9/229	6.5/165	4.5/114
P568794	10	up to 2000/7570	1	9/229	6.5/165	4.5/114

** Kit includes breather assembly, flow control orifice, and user's manual.

Replacement/Maintenance Parts & Schedule

Description	Recommended Change Interval	Part Number
T.R.A.P. breather	6 months	P564669
Ultrapac 2000 Carepack (prefilter element, afterfilter element, desiccant cartridges, set of seals) for Ultrapac adsorption dryer	1 year	ARV-3: P568796 ARV-10: P568797

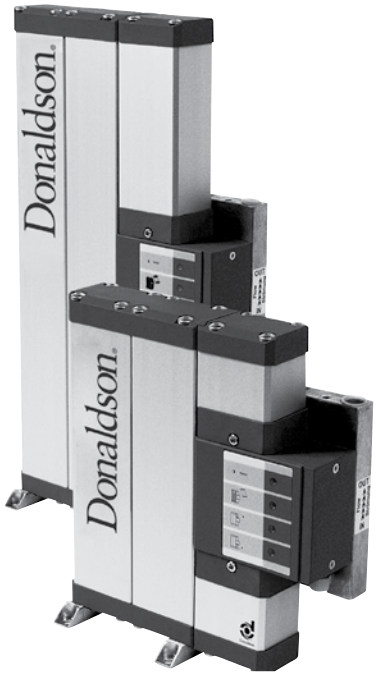
How the Active Reservoir Vent Works



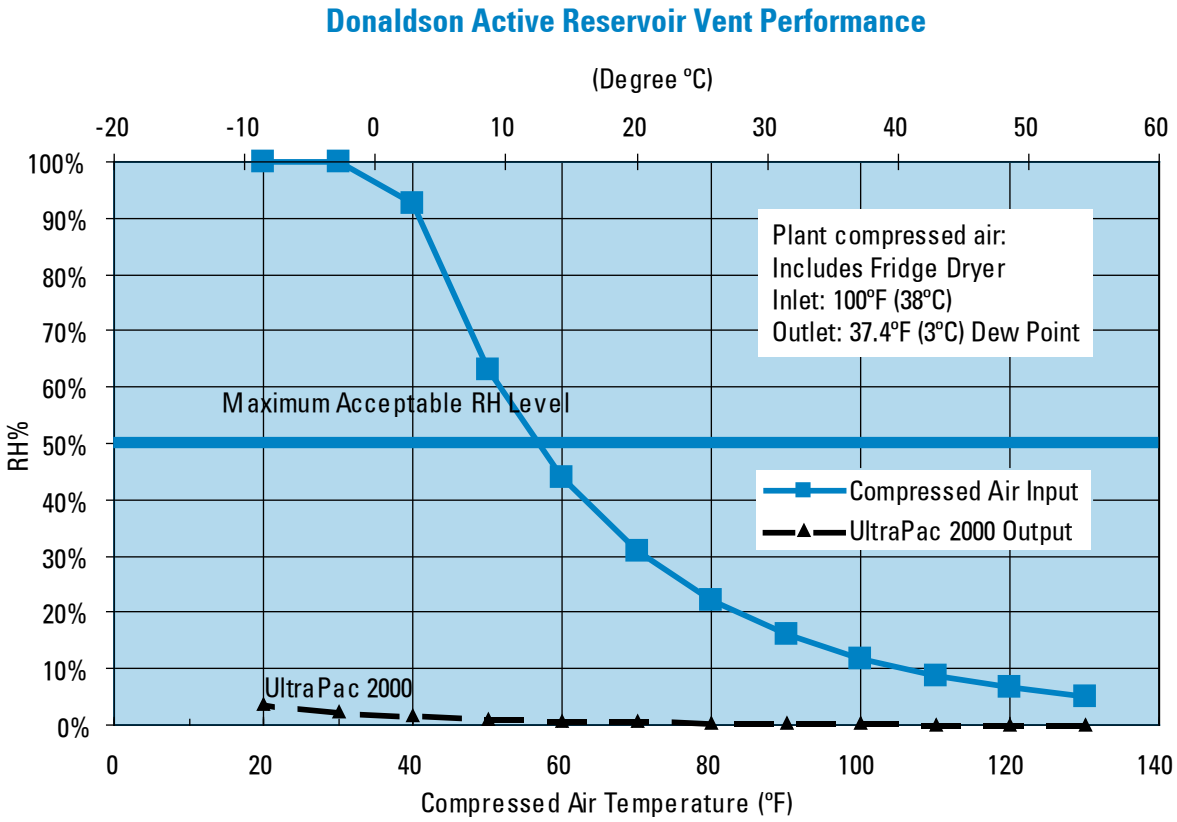
1. Dryer Inlet
2. Processor Control
3. Prefilter
4. Lower Shuttle Valve
5. Desiccant Cartridges
6. Upper Shuttle Valve
7. Afterfilter
8. Dryer Outlet
9. Condensate Drain

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°F/°C and a dew point down to -100°F (-73°C) is available as an option.



Performance Data



ABS, MBS Series

Description:

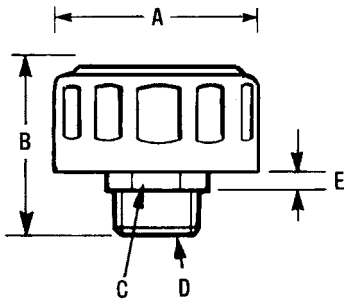
Chrome plated, epoxy coated or zinc plated steel cap
Airflow to 30 cfm/850 lpm
Compatible with petroleum based fluids
Temperature to 212°F / 100°C
1/2", 3/4" and 1" NPT on ABS
1/4" and 3/8" NPT on MBS

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



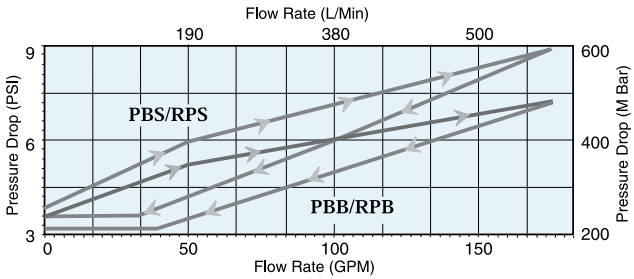
Donaldson Part No.	Description	Micron Rating	Airflow Capacity (cfn/lpm)	A (in./mm)	B (in./mm)	C (in./mm)	D	E (in./mm)	Finish
P562510	MBS-10-N04	10 µm	10/283	1.85/47	2.0/51	.75/19	1/4" NPT	.2/5	Chrome Plated
P562511	MBS-10-N06	10 µm	10/283	1.85/47	2.0/51	.75/19	3/8" NPT	.2/5	Chrome Plated
P562512	MBS-40-N04	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
P562515	MBS-Z-10-N04	10 µm	10/283	1.85/47	2.0/51	.75/19	1/4" NPT	.2/5	Zinc 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

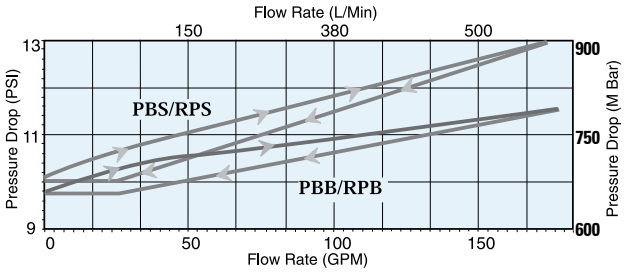
Description:

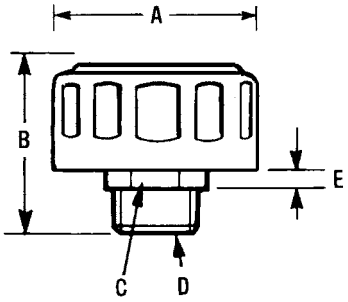
Chrome plated or epoxy coated steel cap
Air intake valve opens at 0.435 *psi/3 kPa*
Compatible with petroleum based fluids
Temperature range
-22°F to +240°F / -30°C to 115°C
Buna gaskets standard
10 and 40 micron available
Relief valve settings at 5 *psi* / 0.34 bar or 10 *psi* / 0.69 bar full rate flow

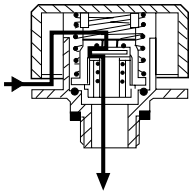
5 PSI/0.34 bar



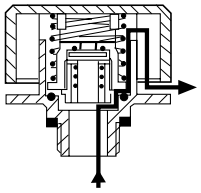
10 PSI/0.69 bar)







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

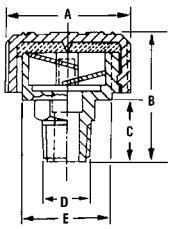
Donaldson Part No.	Description	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/bar)	Dim. A (in./mm)	Dim. B (in./mm)	Dim. C (in./mm)	Dim. D (in./mm)	Dim. E (in./mm)	Finish
P563362	PBS-10-10-N12	10 µm	30/850	10/0.69	3.15 / 80	2.8 / 71	1.18 / 30	3/4" NPT	.5 / 13	Chrome Plated
P563363	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
P563364	PBS-10-5-B12	10 µm	30/850	5/0.34	3.15 / 80	2.8 / 71	1.18 / 30	3/4" BSP	.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
P563867	PBS-40-5-B12	40 µm	30/850	5/0.34	3.15 / 80	2.8 / 71	1.18 / 30	3/4" BSP	.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

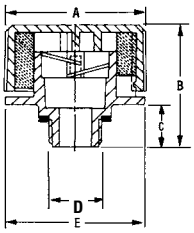
Description:

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/9461 lpm without baffle
Displacements to 144 gpm/547 lpm with anti-splash baffle

CPS / DPS / LPS



BPS / RPS

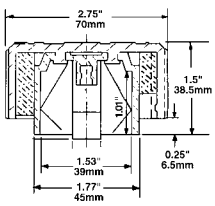


Donaldson Part No.	Description*	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/bar)	Dim. A (in./mm)	Dim. B (in./mm)	Dim. C (in./mm)	Dim. D (in.)	Dim. E (in./mm)
P562486	LPS-40-N04	40 µm	4.9/139	n/a	1.22/31	1.18/30	.39/10	1/4" NPT	1.14/29
P562494	DPS-40-N04	40 µm	4.9/139	n/a	1.65/42	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
P562496	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
P562500	DPS-40-N08-A	40 µm	5.3/150	n/a	1.65/42	2.05/52	.71/18	1/2" 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
P562479	BPS-10-N12	10 µm	33.4/946	n/a	2.75/70	2.48/63	.83/21	3/4" NPT	2.68/68
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
P562489	RPS-10-5-N12	10 µm	30/850	5/0.34	2.75/70	2.48/63	.83/21	3/4" NPT	2.68/68
P562491	RPS-40-2-N12	40 µm	30/850	2/0.14	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

ABO

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



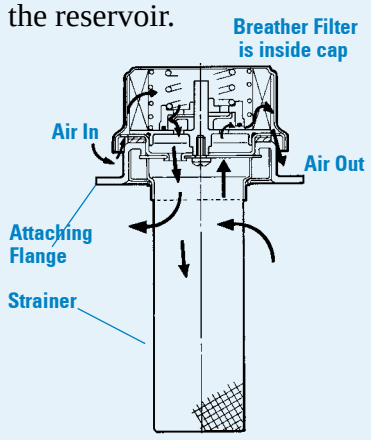
Filler Breather Assemblies

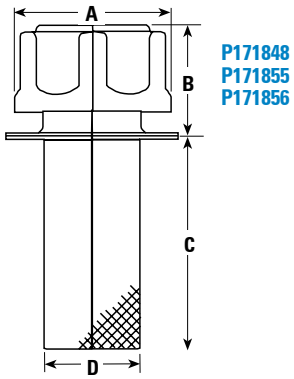
Features

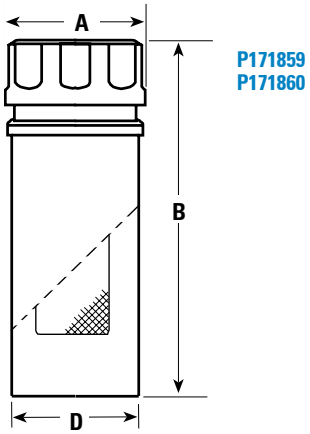
- Removable 500 µm mesh strainer. (Except model P171848, which has a non-removable strainer.)
- 10 µm air breather/filter.
- Models P171855 & P171848 include drilled flanges with attaching screws.

How They Work

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

FLANGE SPECIFICATIONS					FILLER BREATHER SPECIFICATIONS				
Part No.	Outer Dia. (in./mm)	No. of Holes	Hole Dia. (in./mm)	Bolt Circle	Flow (gpm/lpm)	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)
P171848	2.01/51	3	.22/5.5	2.00/51	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)

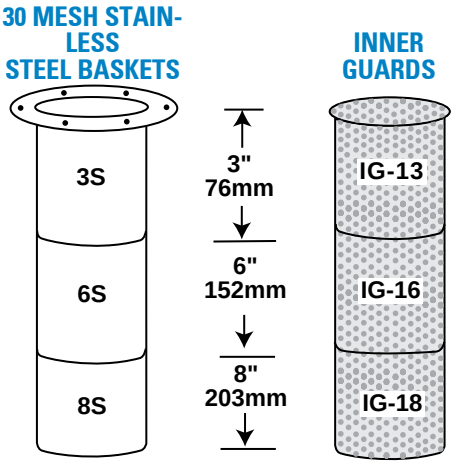
P173292 — fits P171855, P171856, P171859

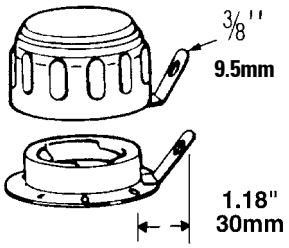
P173364 for pressurized reservoir — fits P171860

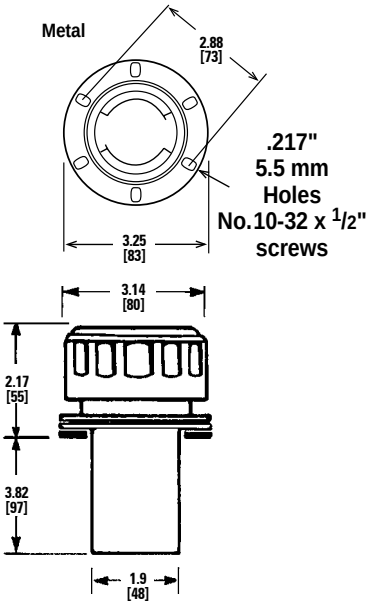
ABB Series Filler Breathers - Bayonet Style

Description:

Chrome plated, epoxy coated or zinc plated steel caps
Air flow 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

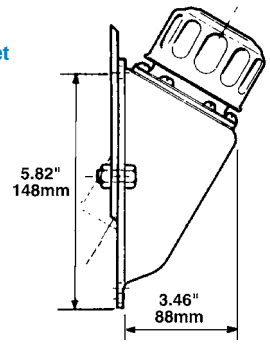


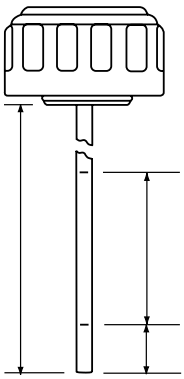




Donaldson Part No.	Description	Features	Micron Rating	Airflow Capacity (cfm/lpm)	Finish
P562610	ABB-W-03-8S-IG	8" STAINLESS BASKET, INNER GUARD	3 µm	30/850	Epoxy Coated, Black
P562611	ABB-W-10-3S	3" STAINLESS BASKET	10 µm	30/850	Epoxy Coated, Black
P562612	ABB-W-10-3S-LT	3" STAINLESS BASKET, LOCK TAB	10 µm	30/850	Epoxy Coated, Black
P562614	ABB-W-10-N	NYLON BASKET	10 µm	30/850	Epoxy Coated, Black
P562616	ABB-W-10-N-R	NYLON BASKET, BUNA GASKET	10 µm	30/850	Epoxy Coated, Black
P562618	ABB-W-40-3S	3" STAINLESS BASKET	40 µm	30/850	Epoxy Coated, Black
P562619	ABB-W-40-6S	6" STAINLESS BASKET	40 µm	30/850	Epoxy Coated, Black
P562620	ABB-W-40-N	NYLON BASKET	40 µm	30/850	Epoxy Coated, Black
P562623	ABB-Z-40-3S	3" STAINLESS BASKET	40 µm	30/850	Zinc Plated
P562624	ABB-Z-40-3S-LT	3" STAINLESS BASKET, LOCK TAB	40 µm	30/850	Zinc Plated
P562625	ABB-Z-40-N	NYLON BASKET	40 µm	30/850	Zinc Plated
P562626	ABB-Z-40-N-R	NYLON BASKET, BUNA GASKET	40 µm	30/850	Zinc Plated

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.



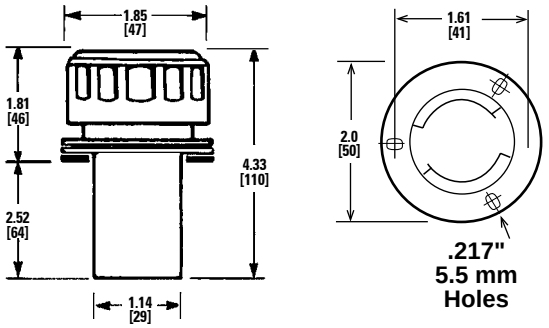


Dipsticks available for some models. See Features section on assembly tables.

Donaldson Part No.	Description	Features	Micron Rating	Airflow Capacity (cfm/lpm)	Finish
P562573	ABB-03-N	NYLON BASKET	3 µm	30/850	Chrome
P562574	ABB-10	FLANGE, SCREWS & GASKET, NO BASKET	10 µm	30/850	Chrome
P562575	ABB-10-3S	3" STAINLESS BASKET	10 µm	30/850	Chrome
P562576	ABB-10-3S-LT	3" STAINLESS BASKET, LOCK TAB	10 µm	30/850	Chrome
P562577	ABB-10-3S-R	3" STAINLESS BASKET, BUNA GASKET	10 µm	30/850	Chrome
P562578	ABB-10-3S-SMB	3" STAINLESS BASKET, SIDE MOUNT KIT	10 µm	30/850	Chrome
P562579	ABB-10-6S	6" STAINLESS BASKET	10 µm	30/850	Chrome
P562580	ABB-10-6S-LT	6" STAINLESS BASKET, LOCK TAB	10 µm	30/850	Chrome
P562581	ABB-10-6S-R	6" STAINLESS BASKET, BUNA GASKET	10 µm	30/850	Chrome
P562582	ABB-10-8S	8" STAINLESS BASKET	10 µm	30/850	Chrome
P562583	ABB-10-8S-D-IG	8" STAINLESS BASKET, DIPSTICK, INNER GUARD	10 µm	30/850	Chrome
P562584	ABB-10-N	NYLON BASKET	10 µm	30/850	Chrome
P562585	ABB-10-N-LT	NYLON BASKET, LOCK TAB	10 µm	30/850	Chrome
P562587	ABB-10-N-R	NYLON BASKET, BUNA GASKET	10 µm	30/850	Chrome
P562589	ABB-40	FLANGE, SCREWS & GASKET, NO BASKET	40 µm	30/850	Chrome
P562590	ABB-40-3S	3" STAINLESS BASKET	40 µm	30/850	Chrome
P562592	ABB-40-3S-R	3" STAINLESS BASKET, BUNA GASKET	40 µm	30/850	Chrome
P562593	ABB-40-3S-SMB	3" STAINLESS BASKET, SIDE MOUNT KIT	40 µm	30/850	Chrome
P562594	ABB-40-6S	6" STAINLESS BASKET	40 µm	30/850	Chrome
P562595	ABB-40-6S-D	6" STAINLESS BASKET, DIPSTICK	40 µm	30/850	Chrome
P562596	ABB-40-6S-LT	6" STAINLESS BASKET, LOCK TAB	40 µm	30/850	Chrome
P562598	ABB-40-8S	8" STAINLESS BASKET	40 µm	30/850	Chrome
P562599	ABB-40-8S-D	8" STAINLESS BASKET, DIPSTICK	40 µm	30/850	Chrome
P562600	ABB-40-8S-LT	8" STAINLESS BASKET, LOCK TAB	40 µm	30/850	Chrome
P562601	ABB-40-CWOF	CAP ONLY	40 µm	30/850	Chrome
P562602	ABB-40-LT	LOCK TAB, NO BASKET	40 µm	30/850	Chrome
P562603	ABB-40-N	NYLON BASKET	40 µm	30/850	Chrome
P562605	ABB-40-N-LT	NYLON BASKET, LOCK TAB	40 µm	30/850	Chrome
P562608	ABB-40-N-R	NYLON BASKET, BUNA GASKET	40 µm	30/850	Chrome
P562609	ABB-40-N-SMB	NYLON BASKET, SIDE MOUNT KIT	40 µm	30/850	Chrome

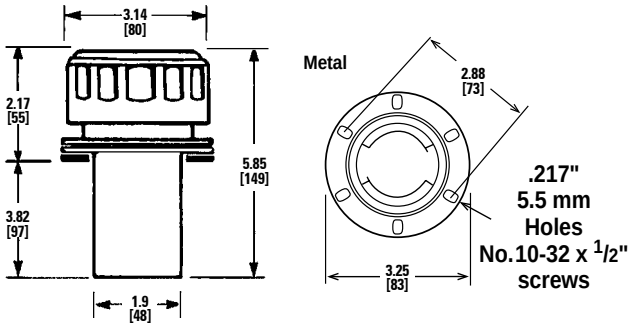
Mini Filler Breather

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



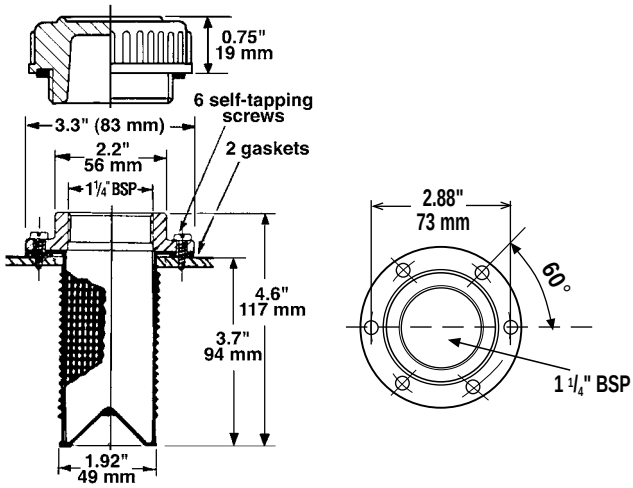
Non-Vent Filler Breather, Bayonet

Donaldson	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 Breather, Threaded

Donaldson	Description	Feature	Finish
P562550	NVT-00-N	FILLER CAP ASSY W/ NYLON BASKET	Black Technopolymer



Filler Breathers

Description:

High impact 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

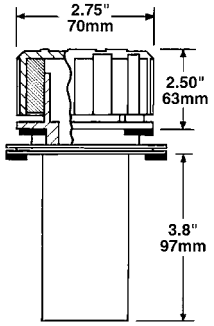
Options: Dipstick
3"/76 mm, 6"/152 mm and 8"/ 203 mm stainless steel baskets

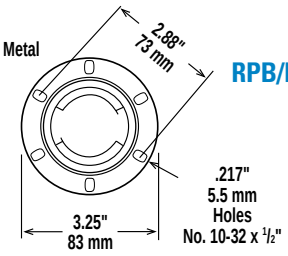
Bayonet Style (RPB) (BPB)

Donaldson Part No.	Description	Feature	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/bar)	Finish
P562552	RPB-10-5-N	NYLON BASKET	10 µm	30/850	5/0.34	Black Technopolymer
P562553	RPB-10-5-N-D-TAD	NYLON BASKET, DIPSTICK	10 µm	30/850	5/ 0.34	Black Technopolymer
P562554	RPB-40-5-3S	3" STAINLESS BASKET	40 µm	30/850	5/0.34	Black Technopolymer
P562555	RPB-40-5-6S	6" STAINLESS BASKET	40 µm	30/850	5/0.34	Black Technopolymer
P562556	RPB-40-5-N	NYLON BASKET	40 µm	30/850	5/0.34	Black Technopolymer
P562534	BPB-10-A CAP ONLY	BREATHER CAP	10 µm	30/850	N/A	Black Technopolymer
P562536	BPB-10-N-A	BREATHER	10 µm	30/850	N/A	Black Technopolymer
P563813	BPB-40 CAP ONLY	BREATHER CAP	40 µm	30/850	N/A	Black Technopolymer
P562537	BPB-40-3S	BREATHER W/3" STEEL BASKET	40 µm	30/850	N/A	Black Technopolymer
P562538	BPB-40-3S-A	BREATHER	40 µm	30/850	N/A	Black Technopolymer
P562539	BPB-40-6S-D	FILLER BREATHER W/DIP STICK	40 µm	30/850	N/A	Black Technopolymer
P562540	BPB-40-A CAP ONLY	BREATHER CAP	40 µm	30/850	N/A	Black Technopolymer
P562541	BPB-40-N	BREATHER	40 µm	30/850	N/A	Black Technopolymer
P562542	BPB-40-N-A	BREATHER	40 µm	30/850	N/A	Black Technopolymer
P562544	BPB-40-N-SMB	BREATHER W/SIDE MOUNT KIT	40 µm	30/850	N/A	Black Technopolymer

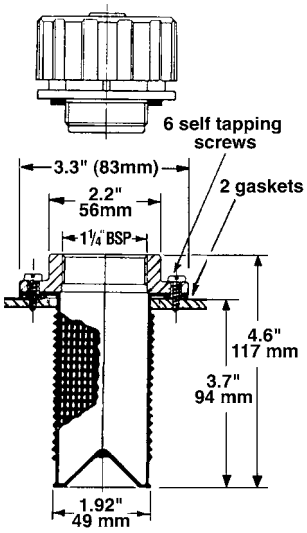
Threaded Flange Style (RPT) (BPT)

Donaldson Part No.	Description	Feature	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/bar)	Finish
P562557	RPT-40-5-6S	6" STAINLESS BASKET	40 µm	30/850	5/0.34	Black Technopolymer
P562560	RPT-40-5-N	NYLON BASKET	40 µm	30/850	5/0.34	Black Technopolymer
P562559	RPT-40-5-CAP ONLY	CAP ONLY	40 µm	30/850	5/.034	Black Technopolymer
P563817	BPT-40-CAP-ONLY	THREADED BREATHER CAP	40 µm	30/850	N/A	Black Technopolymer
P562548	BPT-40-N	THREADED BREATHER	40 µm	30/850	N/A	Black Technopolymer

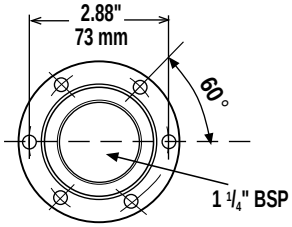




RPB/BPB



RPT/BPT

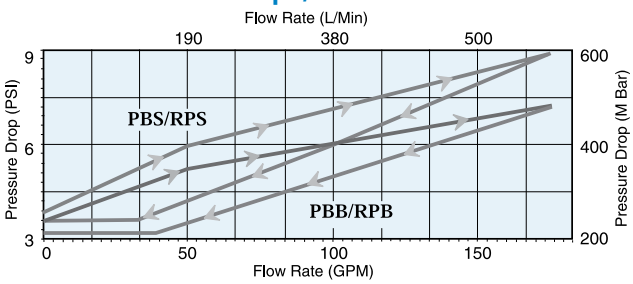


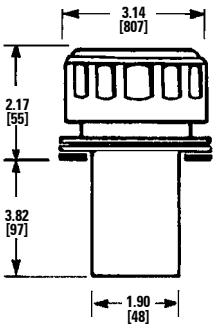
PBB Series Pressure Filler Breather Cap - Bayonet Style

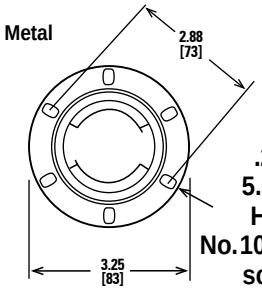
Description:

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 gaskets standard
10 and 40 micron available
Relief valve settings at 5 or 10 *psi*/0.34 or 0.69 bar full rate flow

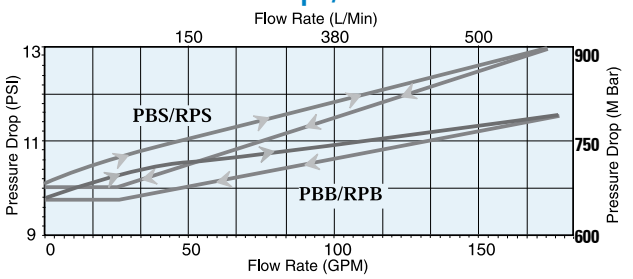
5 psi/0.34 bar







10 psi/0.69 bar

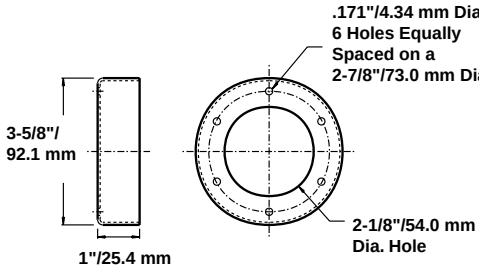


Donaldson Part No.	Description	Feature	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/mm)	Finish
P563346	PBB-10-5-3S	3" STAINLESS BASKET	10 µm	30/850	5/0.34	Chrome
P563347	PBB-10-5-6S	6" STAINLESS BASKET	10 µm	30/850	5/0.34	Chrome
P563348	PBB-10-5-N	NYLON BASKET	10 µm	30/850	5/0.34	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



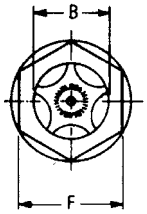
Sight Glasses

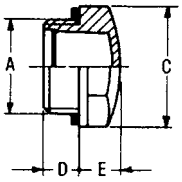
Features

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.

Description:

Transparent polyamid lens
Shock resistant
Anodized aluminum reflector
Operating temperature 210°F / 100°C
BunaN seal
For use with mineral, petroleum and water-based fluids
Any contact with alcohol or solvents must be avoided
Design HFTX





Donaldson Part No.	Description	Thread Size Dim. A (in.)	Dim. B (in./mm)	Dim. C (in./mm)	Dim. D (in./mm)	Dim. E (in./mm)	Dim. F (in./mm)
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

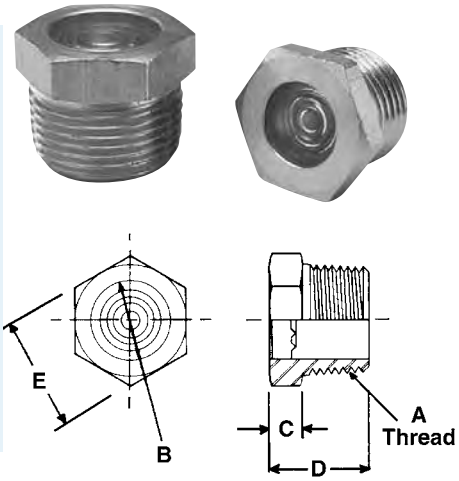
Description:

Prism lenses: special translucent polyamide technopolymer
For low light applications
Body: special black polyamide technopolymer
Available in ¾" and 1" NPT sizes
Resistant to solvents, oils, greases, alkaline acids
Avoid alcohol and detergents containing alcohol
Flat BunaN seal

Donaldson Part No.	Description	Thread Size Dim. A (in.)	Dim. B (in./mm)	Dim. C (in./mm)	Dim. D (in./mm)	Dim. E (in./mm)	Dim. F (in./mm)
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

Description:

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	Thread Size Dim. A (in.)	Dim. B (in./mm)	Dim. C (in./mm)	Dim. D (in./mm)	Dim. E (in./mm)
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

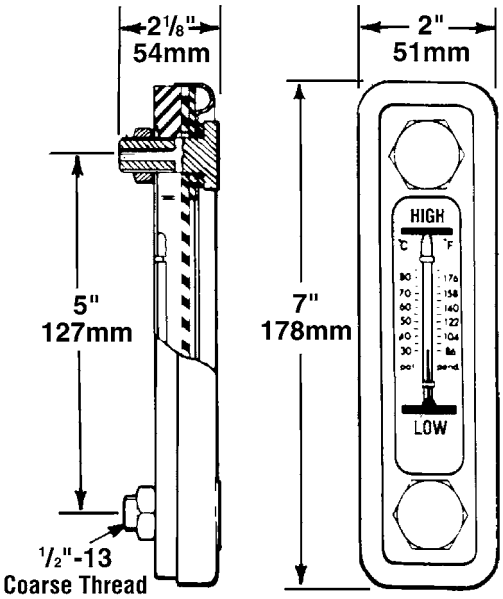
Description:

Steel frame
Acrylic lens
Steel zinc plated bolts
5" (127 mm) mounting bolt centers
Maximum wall thickness: ½"/12.7 mm
Maximum temperature:
SLT 225°F / 107°C; SLG 180°F / 80°C

SLT-1214
P562433

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.

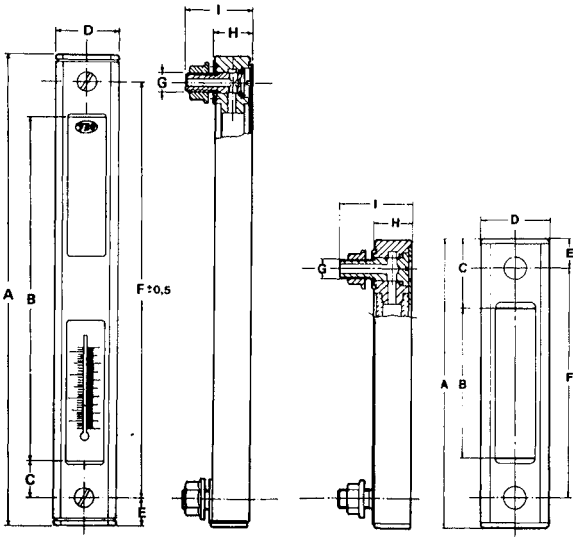


Donaldson Part No.	Desc.	Feature	Seals
P562433	SLT-1214	5"/127 mm Level Gauge w/ Red Thermometer, Chrome Steel Frame	Neoprene

Bolt torque: 15 ft.-lbs./20 Nt-m. Do not exceed 20 ft.-lbs./27 Nt-m.

Description:

Transparent lens material
BunaN 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.



Bolt torque: 10 ft.-lbs/Nt-m.
Inside nut for tightening directly on the tank.
Suggested mounting hole diameter: 11*mm* or 13*mm*.

Oil Level/Temperature Gauge Specifications (35°- 210°F / 0°- 100°C)

(shown above left)

Part No.	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G	H (in./mm)	I (in./mm)
P171920	6.22/158	3.22/82	.89/22.5	1.57/40	.61/15.5	5/127	M12 x 1.5	.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 1.5	.78/20	1.57/40

Oil Level Gauge Specifications

(shown above right)

Part No.	A (in./mm)	B (in./mm)	C (n./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G	H (in./mm)	I (in./mm)
P171918	6.22/1.58	3.23/82	.89/22.5	1.57/40	.61/15.5	5/127	M12 x 1.5	.78/20	1.57/40
P171913	4.21/107	1.22/31	.89/22.5	1.57/40	.61/15.5	3/76	M12 x 1.5	.78/20	1.57/40

Description:

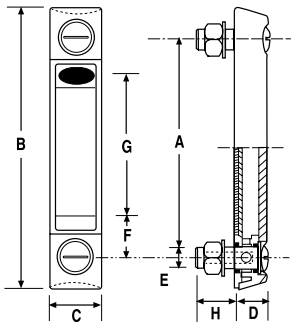
Ultrasonically welded polyamide
Suitable for pressurized reservoirs
Maximum operating temperature:
212°F / 100°C
Scale: 32°F to 212°F / 0°C to 100°C
Maximum wall thickness:
LG-3 - 1/2"/12.7 mm,
LG-5/LG-10 - 3/8"/8.3 mm
BunaN O-Ring seals
Zinc plated bolts
Metric bolts

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

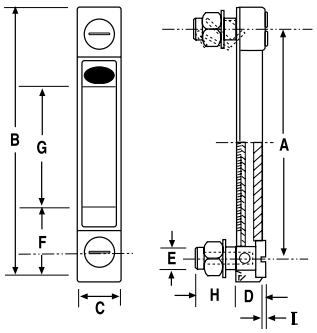
Options:

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)

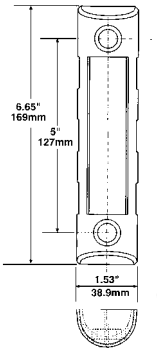
LG Series



LGZ Series



LG-5G Guard



Bolt torque: 9 ft.-lbs./12 Nt-m (7 ft.-lbs./9.5 Nt-m fast mount)

LG-3 FM option E dia. = 0.625 (5/8)
LG-5, 10 FM option E dia. = 0.688 (11/16)

Fluid Level Gauge Guard (LG-5 Series only)

Donaldson Part No.	Description	Feature	Bolt Center Dim. A	Dim. B	Dim. C	Dim. D
P562453	LG-G	5"/127 mm Level Gauge Guard	5.00/127	6.65/169	1.53/39	.98/25

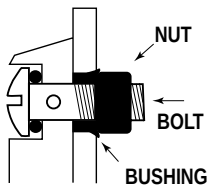
Transparent Polyamide Fluid Level Gauges

Donaldson Part No.	Description	Feature	Bolt Center Dim. A	Dim. B	Dim. C	Dim. D	Hole Dia. Dim. E	Bolt Size	Dim. F	Dim. G	Dim. H	Dim. 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.)

Fluid Analysis Service

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 industrial 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

Benefits of Using the Donaldson 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.

Test Kits and Sampling Supplies

To order test kits, sampling equipment or supplies, contact your local Donaldson Industrial Hydraulics distributor. Refer to the chart at right for recommended sampling intervals by component.

Donaldson Fluid Analysis Products	
The Advanced Industrial Fluid Analysis Kit is designed to monitor component wear, contamination and fluid condition.	
Product	**Part #**
Industrial Fluid Analysis Service	Part #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

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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.

	Component Interval	Suggested Method & Location
Hydraulics	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

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.

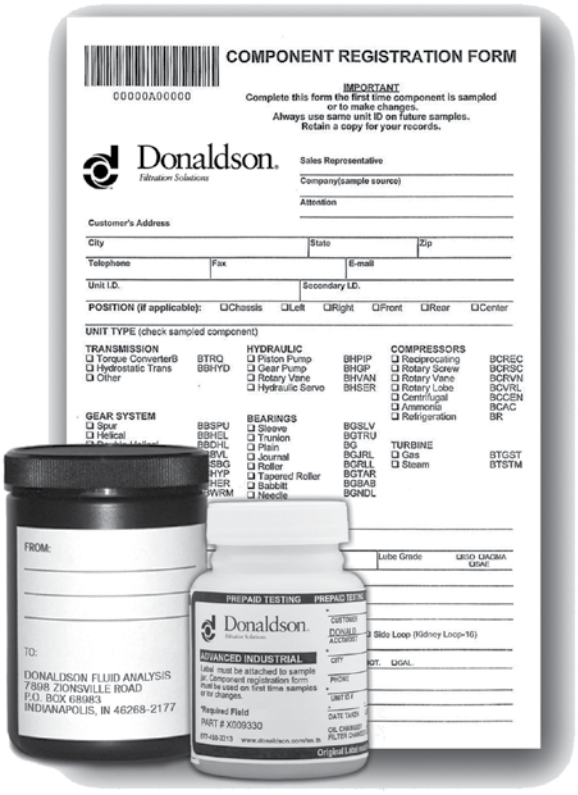
Step 3

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

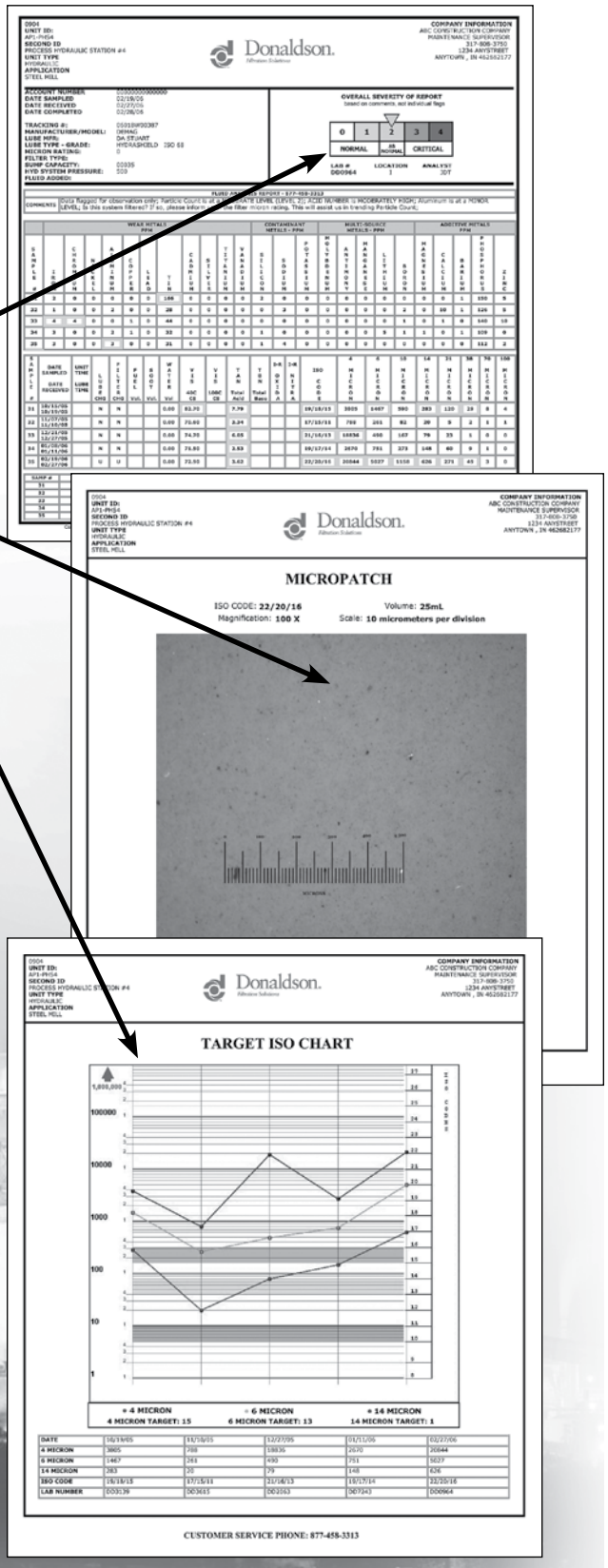
Step 4

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, click on Industrial Hydraulics, and locate Fluid Analysis. Log in with your assigned username and password.



Donaldson

Data Management Solutions That Save You Time and Money



Donaldson's data management solutions make it fast and easy to maximize the value of your test results. 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 photomicropatch 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.

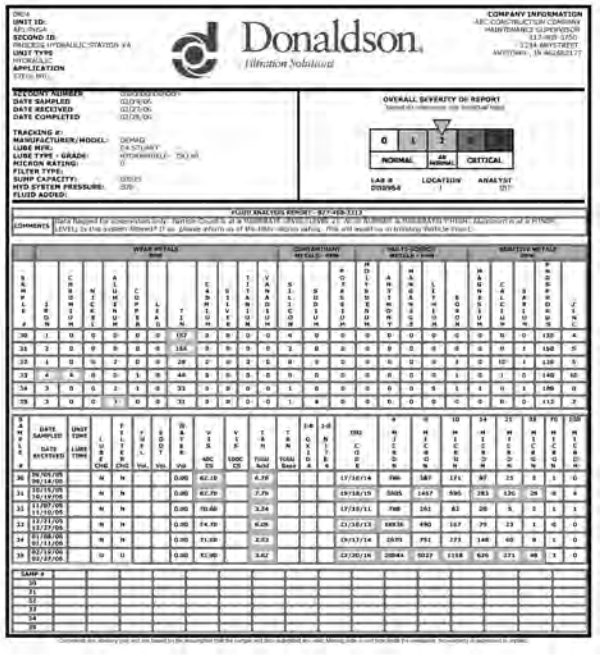
- Get test results almost immediately – online
- Identify significant trends in fluid cleanliness
- Use management reports to pinpoint problems with critical units
- Identify bottlenecks in sample turnaround time
- Influence equipment purchasing decisions
- Access your information from anywhere there is an internet connection

Go to www.donaldson.com and click on Industrial Hydraulics for a reference guide on how to read a fluid analysis report.

Donaldson

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.

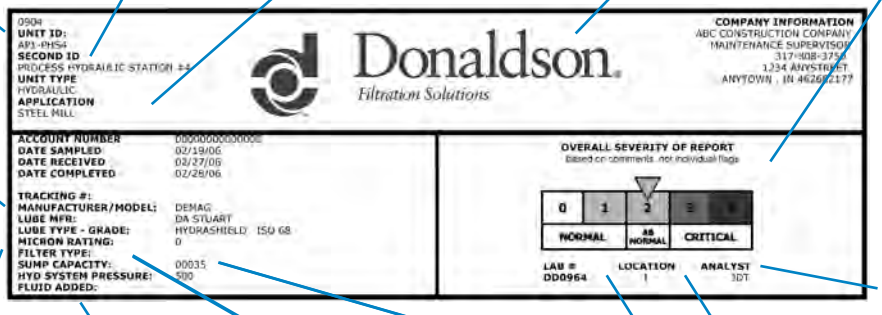
Unit, Lube, Turnaround Time and Account information are listed on the left side of the report emphasizing the data most critical to laboratory processing and data interpretation. Details such as what kind of compressor, gearbox, engine, etc. influences flagging parameters and depth of analysis.

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 lease 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.

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.

Donaldson

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	
COMMENTS	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.

	WEAR METALS PPM											CONTAMINANT METALS - PPM			MULTI-SOURCE METALS - PPM					ADDITIVE METALS PPM				
SAMPLE #	IRON	CHROMIUM	NICKEL	ALUMINUM	COPPER	LEAD	TIN	CADMIUM	SILVER	TITANIUM	VANADIUM	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	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	0	0	0	1	150	5
32	1	0	0	2	0	0	28	0	0	0	0	0	3	0	0	0	0	0	2	0	10	1	126	5
33	4	4	0	0	1	0	44	0	0	0	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	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	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).

	WEAR METALS PPM											CONTAMINANT METALS - PPM			MULTI-SOURCE METALS - PPM					ADDITIVE METALS PPM				
SAMPLE #	IRON	CHROMIUM	NICKEL	ALUMINUM	COPPER	LEAD		CA	S	TIT	VAN	SILICON	SODIUM	POTASSIUM	MOLYBDENUM	ANTIMONY	MANGANESE	LITHIUM	BORON	MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC
30	1	0	0	0	0	0						6	0	0	0	0	0	0	0	0	0	0	135	4
31	2	0	0	0	0	0						2	0	0	0	0	0	0	0	0	0	1	150	5
32	1	0	0	2	0	0						0	3	0	0	0	0	0	2	0	10	1	126	5
33	4	4	0	0	1	0						0	0	0	0	0	0	0	1	0	1	0	140	10
34	3	0	0	2	1	0						1	0	0	0	0	0	5	1	1	0	1	109	0
35	3	0	0	3	0	0						1	4	0	0	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 24 metals, measuring less than 5 microns, that can be present in used oil due to wear, contamination or additives. Wear Metals include iron, chromium, nickel, aluminum, copper, lead, tin, cadmium, silver, titanium and vanadium. Contaminant Metals include silicon, sodium, and potassium. Multi-Source Metals include molybdenum, antimony, manganese, and lithium. Additive Metals include boron, magnesium, calcium, barium, phosphorous and zinc. Elemental Analysis is instrumental in determining the type and severity of wear occurring within a unit.

Standard Test Method Used

ASTM D5185

Reporting Measurement

ppm

Amount of Sample Needed

5 mL

Test Limitation

Possible Sources

Reciprocating Compressors

Shafts, Pistons, Crankhead, Packing Glands, Liners, Housing Casting, Valves

Rotary Compressors

Gears, Shafts, Bearings, Casing

Turbines / Centrifugal Compressors

Shafts, Gears, Bearings, Valves

Hydraulics

Rods, Cylinder, Gears, Shafts, Pistons

Reciprocating Engines

Cylinder Liners, Rings, Gears, Crankshaft, Camshaft, Rods, Valve Train, Oil Pump Gear

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.

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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.

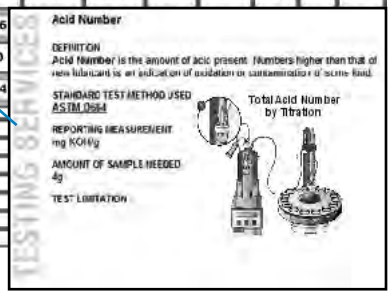
Oxidation measures the breakdown of a lubricant due to age and operating conditions. Oxidation prevents additives from working and therefore promotes increased acid content, as well as increased viscosity. **Nitration** is an indication of excessive "blow-by" from cylinder walls and/or compression rings 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.

Providing your lab with a New Lube sample allows the analyst to verify product integrity and establishes a guideline for analyzing subsequent used oil samples. It will appear first on all reports for the unit. maintenance guidelines and possible wear patterns to expect.

SAMPLE #	DATE SAMPLED / DATE RECEIVED	UNIT TIME / LUBE TIME	LUBE CHG	FILTER CHG	FUEL Vol.	SOOT Vol.	WATER Vol	VIS 40C CS	VIS 100C CS	TAN Total Acid	TBN Total Base	I-R OXIDA	I-R NITRA	ISO CODE	4 MICRON	6 MICRON	10 MICRON	14 MICRON	21 MICRON	38 MICRON	70 MICRON	100 MICRON
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 #
30
31
32
33
34
35



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.

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.

Total **A**cid **N**umber is the amount of acid present in the lubricant. Numbers higher than that of new lube indicate oxidation or some type of contamination. **T**otal **B**ase **N**umber 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.

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).

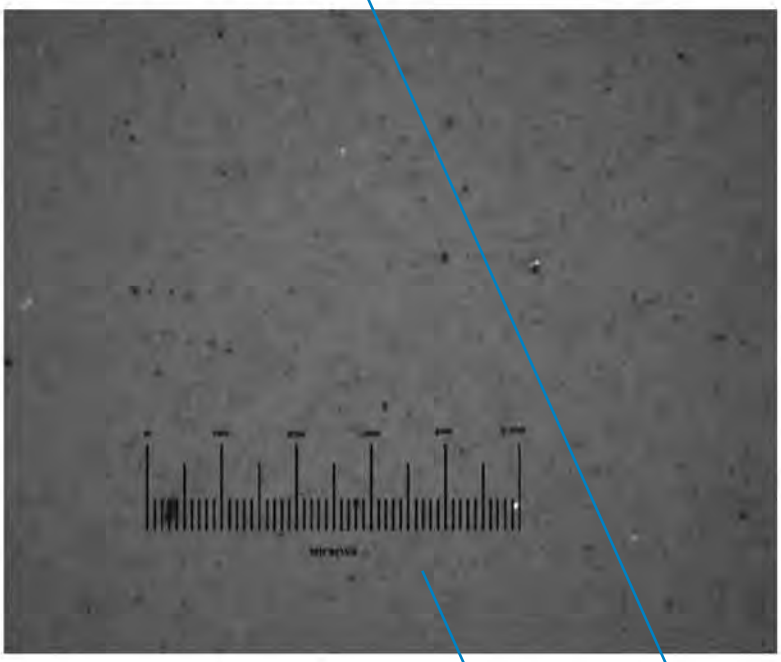
15 13 10
UNIT ID:
AP1-PHS4
SECOND ID
PROCESS HYDRAULIC STATION #4
UNIT TYPE
HYDRAULIC
APPLICATION
STEEL MILL

Donaldson.
Filtration Solutions

COMPANY INFORMATION
ABC CONSTRUCTION COMPANY
MAINTENANCE SUPERVISOR
317-808-3750
1234 ANYSTREET
ANYTOWN , IN 462682177

MICROPATCH

ISO CODE: **22/20/16**
Magnification: **100 X**
Volume: **25mL**
Scale: **10 micrometers per division**



CUSTOMER SERVICE PHONE: 877-458-3313

A Photomicropatch 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.

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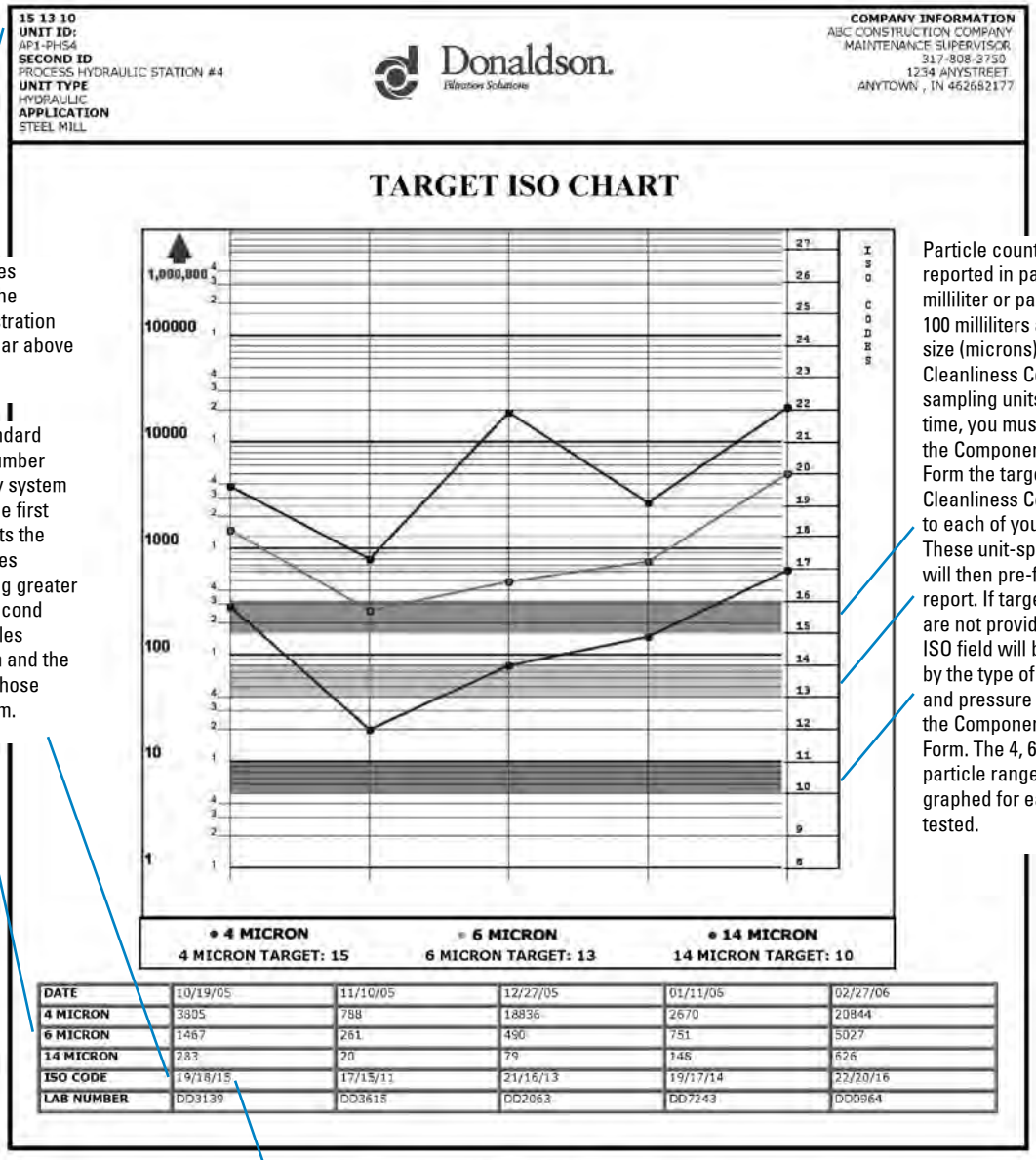


DATE	10/19/05	11/10/05	12/27/05	01/11/06	02/27/06
4 MICRON	3805	788	18836	2670	20844
6 MICRON	1467	261	490	751	5027
14 MICRON	283	20	79	148	626
ISO CODE	19/18/15	17/13/11	21/16/13	19/17/14	22/20/16
LAB NUMBER	DD3139	DD3615	DD2063	DD7243	DD0964

If target ISO codes are provided on the Component Registration Form, it will appear above the unit ID.

The ISO 4406 standard utilizes a three number system to classify system cleanliness — The first number represents the number of particles present measuring greater than 4 µm. The second represents particles greater than 6 µm and the third represents those greater than 14 µm.

Particle count results are reported in particles per milliliter or particles per 100 milliliters at a given size (microns) and ISO Cleanliness Code. When sampling units for the first time, you must include on the Component Registration Form the target ISO Cleanliness Codes specific to each of your applications. These unit-specific codes will then pre-fill on each test report. If target ISO codes are not provided, the target ISO field will be determined by the type of hydraulics and pressure rating listed on the Component Registration Form. The 4, 6 and 14 micron particle ranges are then graphed for each sample tested.

Each of the ISO Code's three numbers represents an ISO range. For example, the ISO Cleanliness Code for the most recent sample in this report is 19/18/15. Because the number of 4µm particles is between 2,500 and 5,000, the corresponding ISO code is 19. Because the number of 6µm particles is between 1,300 and 2,500, the corresponding ISO code is 18. Because the number of 14 µm particles is between 160 and 320, the corresponding ISO code is 15.

Donaldson

Portable Fluid Analysis Kit

The **Donaldson Portable Fluid Analysis Kit** 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.

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.

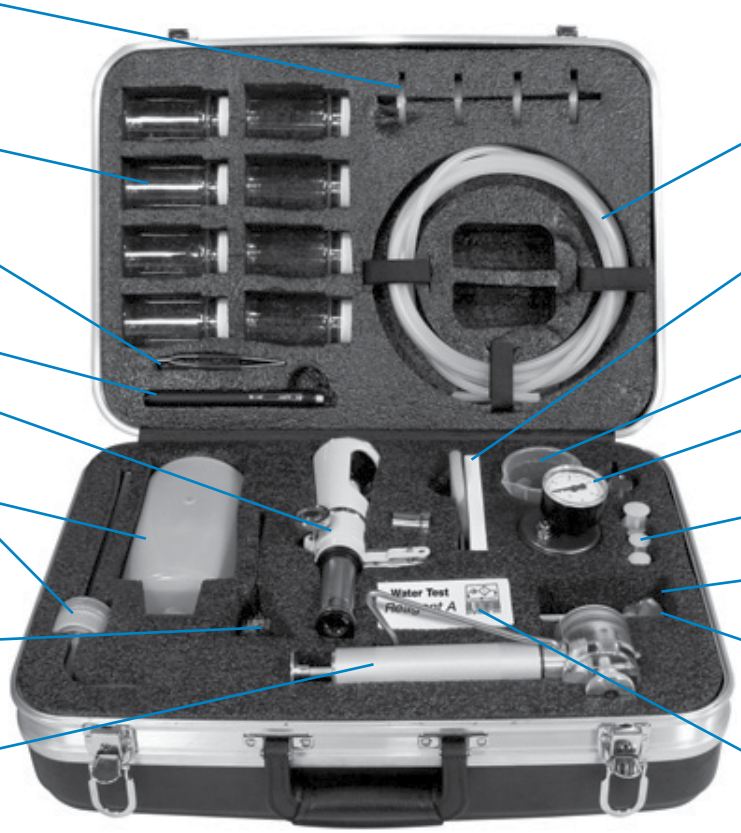
Benefits

- Easy to use
- Results in as little as 10 minutes
- Measures particulate and water contamination levels
- Provides reliable results

Donaldson

Portable Fluid Analysis Kit

Kit Part Number X009329 Height: 14.5" Width: 19.25" Depth: 7.75" Weight: 9.95 lbs
Replacement part numbers listed below



Operation Instructions

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.

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HIAC PODS
Portable Oil Diagnostic System

Intelligent and robust, the HIAC Portable Oil Diagnostic System (PODS) measures, stores and reports oil condition parameters essential for reliable hydraulic systems operation. The PODS 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 HIAC 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 HIAC PODS contains a buffer for 500 records. The PODSControl analysis software provides real-time data download and visualization, as well as data analysis, formatting and reporting.

The HIAC 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 µm(c) sizes (4/6/14) or to the previous ACFTD µm 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.

Features

- **Efficient and intuitive to use**
- **Immediate laboratory-quality onsite results**
- **Reports SAE and ISO cleanliness classifications, 4/6/14 µm(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**

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Performance Specifications

Product Part Number	P567843	
Number of Channels	8	
Size Channels	ISO-MTD (standard)	4, 4.6, 6, 9.8, 14, 21.2, 38, 68 µm
	ACFTD (optional)	~1, 2, 5, 10, 15, 25, 50, 100 µm
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, ±0.5°C (32 to 212°F, ±0.9°F)	
Viscosity Range	10 to 424 cSt	
Measurement	10 to 424 cSt ±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	CO2, 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, CO2 Bottles, Hand Pump, Sample Bottles, PODSControl Software	
Optional Accessories	Ultrasonic Bath Additional Sample Bottles Additional CO2 Bottles	

Filter Cart
for Industrial Applications

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 element 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.

Features	Benefits
Rugged and durable frame	Enables long service life
High efficiency media grades	Cost effective filtration
Two pressure filters	Two-stage filtration – Coarse/Fine or Particulate/Water
Safety relief valve	Prevents over pressurizing and damage to pump, hoses and filters
Overload protected switch	Prevents motor/pump from overheating

Applications

- **Filter new fluid – New fluids are usually above the recommended ISO cleanliness level**
- **Off-line filtration – Filter cart can be used to supplement existing filtration**
- **Transferring fluid – Fluid is transferred from a storage container (tote, drum, tank, etc.) to a machine's reservoir**
- **Water removal – Using Donaldson water removal elements can help remove free water from the system**
- **Flushing after repairs and rebuilds – After machines are serviced or repaired they need to be flushed thoroughly before they are returned to service**
- **Flushing during equipment commissioning – New machines have original fabrication debris and dirt that has ingressed during transport and storage**

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Features

Stainless steel wands
- Will not break, won't corrode

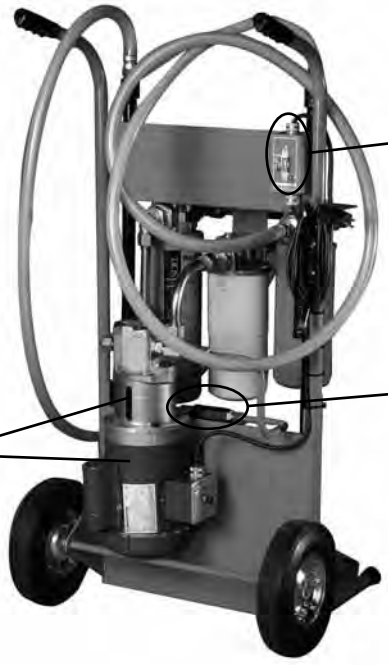
Differential pressure indicators
- Lets you know when to change elements

Two pressure filters mounted in series
- Allows for particulate/water removal or coarse/fine particle removal

Clear braided hoses
- Visually shows fluid flowing

Suction filter
- Protects pump

Removable angled drip tray
- Easy clean up, fluid will not leak out when tipped back



Overload protected switch
- Protects motor and pump from overheating

Safety relief valve
- Protects against over pressurizing

Motor/Pump
- Industrial brand name

Motor mounted on back
- Better balance
- Fluid will not drip on motor when changing filters

Oil sampling valve (not shown)
- Monitors filter performance and cleanliness of oil

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Filter Cart Ordering Code

Example

Model	Flow Rate	Power Supply	Suction Filter	Pressure Filter #1	Pressure Filter #2
DFC	10	P1	WM	3	WA
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5

Shipped fully assembled, tested and ready to use.

Select one option from each table below.
(See example shown above.)

TABLE 1
Flow Rate

10	10 GPM/38 lpm

TABLE 2
Power Supply

P1	110 VAC / 60 Hz
P2	110 VAC / 50 Hz
P3	230 VAC / 60 Hz
P4	230 VAC / 50 Hz

TABLE 3
Suction Filter

WM	Wire Mesh 150 µm

TABLE 4
Pressure Filter #1

WA	Water absorbing
3	Synteq® Beta 1,000 at < 3 micron
6	Synteq Beta 1,000 at 6 micron
10	Synteq Beta 1,000 at 10 micron
14	Synteq Beta 1,000 at 14 micron
23	Synteq Beta 1,000 at 23 micron

TABLE 5
Pressure Filter #2

WA	Water absorbing 10 µm
3	Synteq Beta 1,000 at < 3 micron
6	Synteq Beta 1,000 at 6 micron
10	Synteq Beta 1,000 at 10 micron
14	Synteq Beta 1,000 at 14 micron
23	Synteq Beta 1,000 at 23 micron

Element Chart

Micron Rating						
WM	WA	3	6	10	14	23
P550276	P179075	P564468	P170906	P176567	P170949	P173789

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Specifications

Electrical Service:	115 volts: 16 amp, single phase
	230 volts: 8 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*
	50 Hz: 8.3 gpm/31 lpm*
Maximum Recommended Fluid Viscosity:	500 SUS or 108 cSt*
Compatibility:	Mineral based fluids*
Operating Temperature:	-10° F to 150° F (-23° C to 65° C)
Filter Bypass Valve Settings:	Suction – 5 psid/0.34 bar, Pressure – 25 psid/1.7 bar
Weight:	approx. 140 lbs. (63.5 kg)
Dimensions:	Height: 47" (1194 mm) Width: 24" (610 mm) Depth: 23" (585 mm) Hose/Wand assembly length: 10' (3.05 m)

*Contact Donaldson for special order options

Using the Donaldson Filter Cart

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 to following formula to calculate the amount of time needed to achieve single-pass filtration:

(Reservoir Size x 7) / Filter Cart Flow Rate = 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 ingression, choice of media grades and other variables.

Donaldson

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 element 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.

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 elements can help 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.

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Filter Buddy Ordering Code

Example

Model	Flow Rate Table 1	Power Supply Table 2	Wand Kit Table 3	Pressure Filter #1 Table 4	Pressure Filter #2 Table 5
DFB **DFB HV** (Hgh Viscosity)	2	P1	N	WA	10

Select one option from each table below.

(See example shown above.)

TABLE 1
Flow Rate

2	2 gpm/7.6 lpm

TABLE 2
Power Supply

P1	110 VAC / 60 Hz
P2	110 VAC / 50 Hz
P3	230 VAC / 60 Hz
P4	230 VAC / 50 Hz

TABLE 3
Wand Kit

Y	Yes
N	No

TABLE 4
Pressure Filter #1

WA	Water Absorbing
4	Synteq® Beta 1000 at <4 micron
9	Synteq Beta 1000 at 9 micron
10	Synteq Beta 1000 at 10 micron
23	Synteq Beta 1000 at 23 micron

TABLE 5
Pressure Filter #2

WA	Water Absorbing
4	Synteq® Beta 1000 at <4 micron
9	Synteq Beta 1000 at 9 micron
10	Synteq Beta 1000 at 10 micron
23	Synteq Beta 1000 at 23 micron

Element Chart

Micron Rating				
WA	4	9	10	23
P560584	P165185	P165332	P176566	P163567

Specifications

	Low Viscosity	High Viscosity
Electrical Service: 115 volts: 8.4 amp, single phase 230 volts: 4.2 amp, single phase		
Pump:	2 gpm (7.6 lpm)	1.8 gpm (6.8 lpm)
Motor:	½ hp ODP	¾ hp ODP
Maximum Recommended Viscosity:	900 SUS (200 cSt)	8000 SUS (1700 cSt)
Compatibility: Mineral-based fluids, Water glycols, Polyol esters		
Hoses: 4' (1.2m) suction, 7' (2.1m) discharge; terminated with male NPT connections **Suction:** **Discharge:**	¾" (1.9 cm) OD ½" (1.3 cm) OD	1" (2.5cm) OD ¾" (1.9 cm) OD
Stainless Steel Wand Kit (optional): 40" (1.0 m) suction, 20" (.5 m) discharge		
Weight:	Approx. 45 lbs. (20 kg)	Approx. 50 lbs. (23 kg)
Dimensions: **Height:** **Width:** 13" (330 mm) **Length:** 26" (660 mm)	21" (533 mm)	25" (635 mm)

Filter Panels
Fixed-Mounted Offline 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 l/min) 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 element for water/particle removal.

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 elements can help 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.

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Filter Panels Ordering Code

Example

Model	Flow Rate Table 1	Power Supply Table 2	Start/Stop Switch Table 3	Pressure Filter #1 Table 4	Pressure Filter #2 Table 5
DFP	10	P1	N	WA	10

Select one option from each table below.

(See example shown above.)

TABLE 1
Flow Rate

3	3 gpm/11.4 lpm
5	5 gpm/18.9 lpm
10	10 gpm/37.9 lpm

TABLE 2
Power Supply

P1	110 VAC / 60 Hz
P2	110 VAC / 50 Hz
P3	230 VAC / 60 Hz
P4	230 VAC / 50 Hz

TABLE 3
Stop/Start Switch

Y	Yes
N	No

TABLE 4
Pressure Filter #1

WA	Water Absorbing
4	Synteq® Beta 1000 at <4 micron
9	Synteq Beta 1000 at 9 micron
11	Synteq Beta 1000 at 11 micron
23	Synteq Beta 1000 at 23 micron

TABLE 5
Pressure Filter #2

WA	Water Absorbing
4	Synteq® Beta 1000 at <4 micron
9	Synteq Beta 1000 at 9 micron
11	Synteq Beta 1000 at 11 micron
23	Synteq Beta 1000 at 23 micron

Element Chart

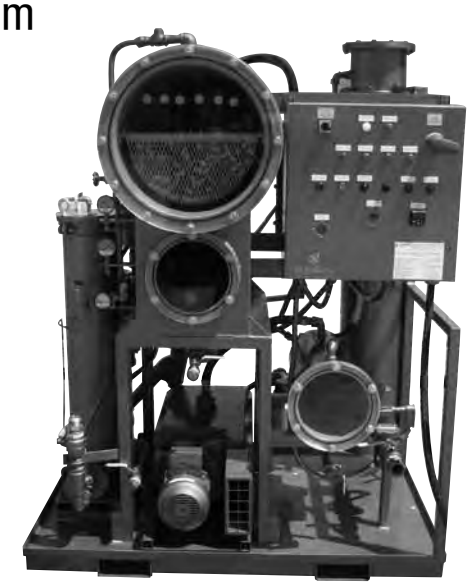
Micron Rating				
WA	4	9	11	23
P179075	P564468	P179763	P170949	P173789

Specifications

	Flow Rates		
Gear Pump:	3 gpm (11.4 l/min)	5 gpm (18.9 l/min)	10 gpm (37.9 l/min)
Electrical Service: **115 volts** **230 volts**	 8.4 amp 4.2 amp	 16 amp 8 amp	 20 amp 10 amp
Motor:	½ hp TEFC	¾ hp TEFC	1 hp TEFC
Maximum Recommended Viscosity:	500 SUS (108 cSt)	500 SUS (108 cSt)	500 SUS (108 cSt)
Compatibility: Mineral-based fluids, Water glycols, Polyol esters			
Connections: **Inlet (pump):** SAE 12 O-Ring **Outlet:** SAE 20 O-Ring			
Weight: Approx. 95 lbs. (43 kg)			
Dimensions: **Height:** 20" (508 mm) **Width:** 36" (915 mm) **Depth:** 8" (203 mm)			

Donaldson

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 element 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
Product Restrictions		

IMPORTANT: 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).

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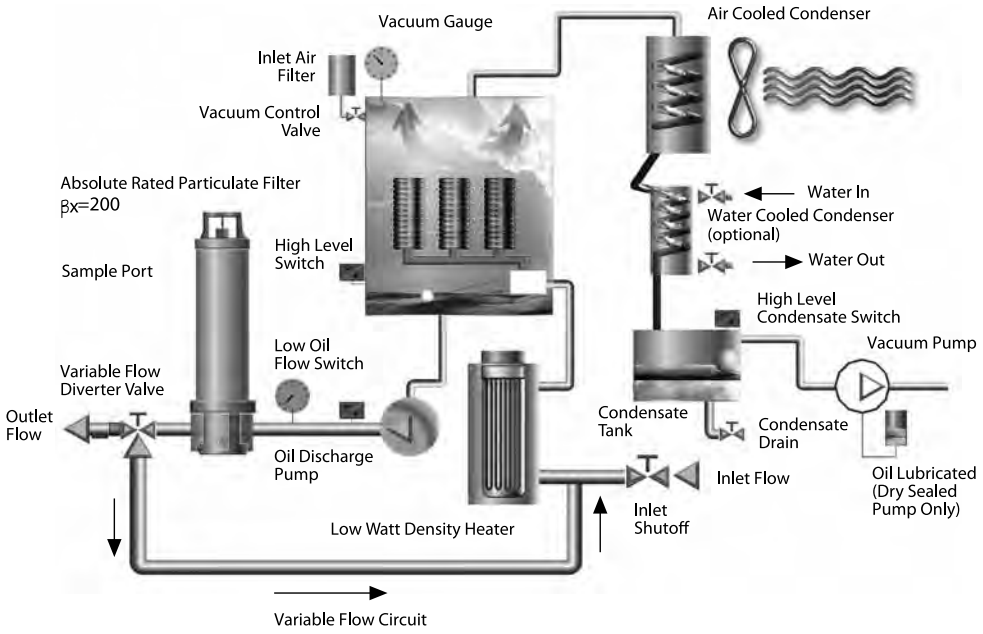
Liquid Purification Systems Flushing Systems & Services

Donaldson introduces a new line of high quality oil, fuel and fluid filtration systems. Our systems provide innovative and environmentally sound solutions for purifying contaminated oils, fuels and many other fluids for a variety of industrial applications.

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.

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 elements inside the vacuum tower. Contaminated oil flows through the pores of these elements, is exposed to the vacuum and dehydrated. Dried oil is removed, filtered and pumped back into the reservoir.



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).

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

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
Installation Requirements		
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
Mechanical Operating Specifications		
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
Product Restrictions		

IMPORTANT: 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.

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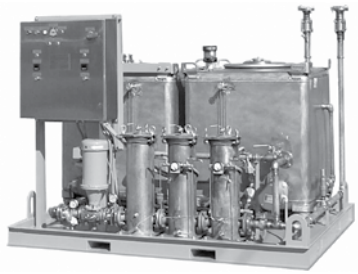
LTC Transformer Filtration

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.

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.

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.

Flushing Services

We will perform a turnkey flush on your site, providing all pumps, heaters, hoses and filters. Qualified technicians verify the results to required ISO cleanliness codes with our Portable Oil Analysis Kit.

Industrial Fluid Purification Common 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

Western Filter

Donaldson's acquisition of Western Filter has added 23 new housings including 2 duplex housings to our product offering. This gives you an expanded range of flow rates, pressures and port arrangements. Information on each housing is available online at www.donaldson.com/en/ih, or you can order a Western Filter catalog (HYD-110) through Customer Service.

Intank

The WL Intank series is designed for return line applications. These filters operate with pressure up to 200 psi/14 bar and flows to 200 gpm/757 lpm. The WL16 and WL18 series offers additional design flexibility with the optional anti-drain valve for side mounting the filter to the reservoir.

Low Pressure

The designs offered in this filter series accommodate the need for a full range of port types and configurations. Working pressures range from 500 psi/34 bar to 800 psi/55 bar and are available with Coreless media.

Donaldson

Western Filter

Medium Pressure

Medium Pressure series filters are designed for continuous working pressures up to 4500 psi/310 bar and flows from 20 gpm/76 lpm to 150 gpm/568 lpm. Many of the filters within this pressure range conform to the AIAG automotive HF2, HF3, and HF4 specifications.

High Pressure

High Pressure series filters are designed for pressure line applications where design flexibility is required. Besides the standard T-Type and/or L-Type porting, we offer manifold type filters to provide compact and direct mount installation. This series is rated for flow from 50 gpm/189 lpm to 150 gpm/568 lpm and a working pressure range from 4500 psi/310 bar to 6000 psi/414 bar.

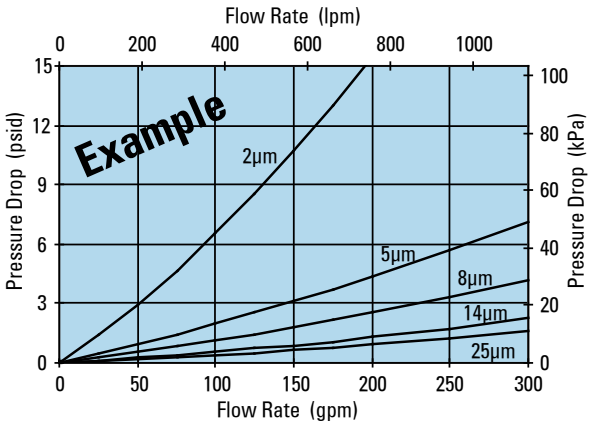
Duplex

Duplex filters are designed to meet the needs of critical hydraulic and lubrications circuits where continuous flow filtration is required during routine maintenance. The Duplex filters offer a working pressure range from 400 psi/28 bar to 3000 psi/207 bar and flows from 50 gpm/189 lpm to 300 gpm/ 1136 lpm.

How Donaldson Derives Filter Performance Data

Donaldson Testing Procedures

The numbers on the performance curves refer to specific Donaldson media formulations such as #1, #6, #20, etc. Beta ratings and part numbers specific to each media can be found on the individual filter pages of this catalog. All flow measurements were made with 32cSt [150 SSU] hydraulic oil at 100°F (37.7°C), fluid specific gravity of 0.9.



Pressure Drop Calculation

Clean Filter Assembly = head ΔP + element ΔP

Calculation Definitions

ΔP_E = Element pressure drop from curve
ΔP_M = Corrected element pressure drop
S.G. = New specific gravity
SSU = New SSU viscosity (Saybolt Seconds Universal)
cSt = New cSt viscosity (centistokes)
cP = New cP viscosity (centipoise)

Corrections

To correct element drops for viscosity and/or specific gravity, use one of these formulae:

- $\Delta P_M = \Delta P_E \times (SSU/150) \times (S.G./0.9)$

  - or -

- $\Delta P_M = \Delta P_E \times (cSt/32) \times (S.G./0.9)$

  - or -

- $\Delta P_M = \Delta P\ P_E \times (cP/29)$

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Warranty and Claims

Donaldson Company, Inc. warrants its products against failure due to defects in materials and workmanship for the period specified under Terms and Conditions for the particular part. Donaldson Company's obligation under this warranty covers replacement of the failed part including transportation charges. If the Donaldson product failure is the sole and direct cause of damage to the equipment on which the product was installed, Donaldson Company will reimburse reasonable costs to restore the equipment to the condition it was in immediately before the failure. This warranty does not cover failure due to misapplication, misuse, abuse, neglect, rust through and corrosion, improper service practices or non-Donaldson approved modification. This warranty gives you specific legal rights. You may have other rights which may vary from state to state. Engine and Equipment Manufacturers warranties remain in effect when Donaldson products are used. Donaldson Company must be notified of any claims covered by this warranty within one year of the date of failure.

Application of Warranty

With the objective of providing the maximum amount of protection with the least amount of inconvenience to the customer, we will apply the Warranty Policy as follows:

1. Every effort will be made to determine the cause of failure. Cause of failure will be used to determine the responsible party(s). In the event of damage to the equipment on which the product is installed, if the cause of failure cannot be clearly determined, and there is no evidence of customer fault, Donaldson Company will contribute toward repair of the damage on a shared expenses basis rather than leave the customer without any recovery.

2. In cases where there is evidence of customer responsibility in the failure, we will negotiate a settlement that is fair and reasonable to all parties. With the customer's agreement, we will provide failure investigation and product maintenance and service training with the goal of preventing future failures.

Provisions

Warranty coverage begins on the date the part is purchased by the user and expires when the specified number of years has passed.

Action Items to Process a Warranty Claim

It's simple. Call your customer service representative immediately. Your rep will ask you for the following information to start the process:

- Donaldson part number;
- Problem description;
- Customer business name;
- Customer location — specify where the product was purchased;
- Individual to contact (including phone and fax number); and
- Location of defective product.

What to Do with the Product

Do not destroy the product — please hold the defective product until contacted by Donaldson technical support specialist.

If the Donaldson technical support specialists asks you to return the product to Donaldson, you will receive a warranty claim package that will include:

- the Donaldson Return Material Authorization form (RMA);
- a special shipping label (UPS-Authorized Return System — this UPS-ARS process will be used only for the return of product for warranty or liability review); and
- and special packaging instructions.
- Contact UPS for pickup

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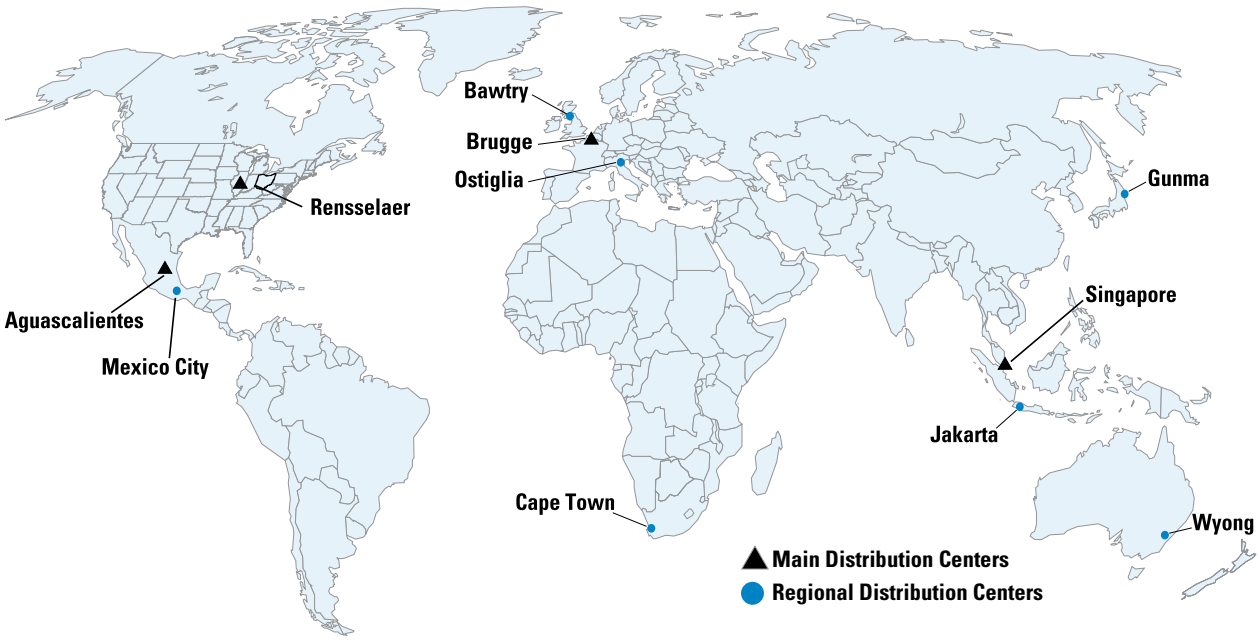


Worldwide supply chain Capability

Donaldson Distribution Centers Worldwide

Donaldson has developed the expertise to ensure a constant supply of products to meet the demands of our worldwide customers. For example, each month Donaldson's distribution center in Rensselaer loads and ships over 95 ocean containers.

Donaldson's export distribution partners rely on our ability to consistently process and ship inter-national ocean and air shipments quickly and accurately.

The majority of stocked product orders from Donaldson's customers outside of North America are enroute to their final destination via ocean container within five working days.

To minimize the duty and freight expenses for our customers in Central and South America, Donaldson can ship international export orders from our distribution center adjacent to our manufacturing facility in Aguascalientes, Mexico.

Many Donaldson customers in other regions around the world place their export orders through the Donaldson European distribution center in Brugge, Belgium or our Asia/Pacific distribution center in Singapore.

35 Years of On-Time Service to our Distribution Partners

In 1974, the first Donaldson distribution center was located in the beautiful river bluff country of Quincy, Illinois USA. This ware-house was located in the caves along the Mississippi River.

After a few years, the caves did not have adequate space nor facilities to meet the growing demands of our independent and OE dealer distribution channels, so Donaldson moved into another facility in the Quincy area. In the 20 years that Donaldson was located here, the distribution center grew to a total of 165,000 square feet.

North American warehouse operations in Rensselaer, Indiana.

Donaldson

Technical Reference Guide "The Blue Pages"

Donaldson provides this technical reference as a short course in "Hydraulic Filtration 101"—for those who want to gain a better understanding of fluid power filtration.

In industrial 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 guide is offered to aid in choosing the filter that will help you achieve the ideal cleanliness levels and longest life for your critical components.

Material in this section is in the public domain, not confidential, and may be copied for educational purposes at any time. Information was collected from many sources, both public and private, including Donaldson Company, Inc. Engineering Departments, Eaton Corporation, the Lightning® Reference Handbook from Berendsen Fluid Power, Hydraulics & Pneumatics Magazine, National Fluid Power Association (NFPA), and various industry authorities.

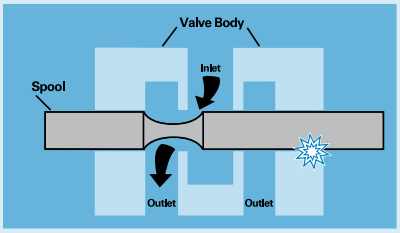
Symbols Used

ß	Beta Ratio
cSt	Centistokes
ΔP	Pressure Drop or Differential Pressure
ISO	International Standards Organization
µm	Micron or micrometer
ppm	Parts per million
SSU SUS	Saybolt Seconds Universal

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 cutaway view 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 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.

Component Damage

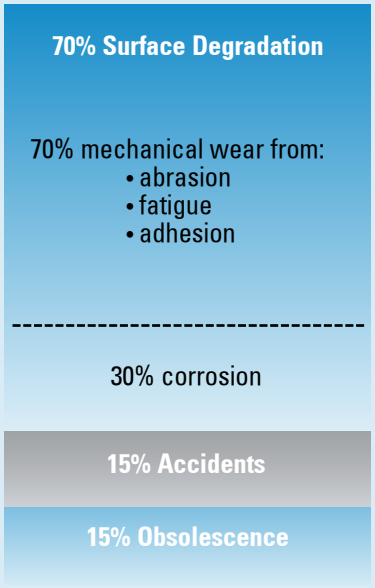
Looking down the barrel of an hydraulic cylinder, we can see the scratches along the inside surface. Don't cut costs by eliminating hydraulic filters. It could cost you more in the long run in major component repairs.

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
- Sealant (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.



* Teflon is a registered trademark of E.I. Dupont de Nemours & Co., Inc.

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Where Contamination Comes From

There are surprising number of different sources of system contamination in hydraulic filtration.

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 µm.) 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.

Built-In

Built-in contamination, also called primary contamination, is caused during the 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

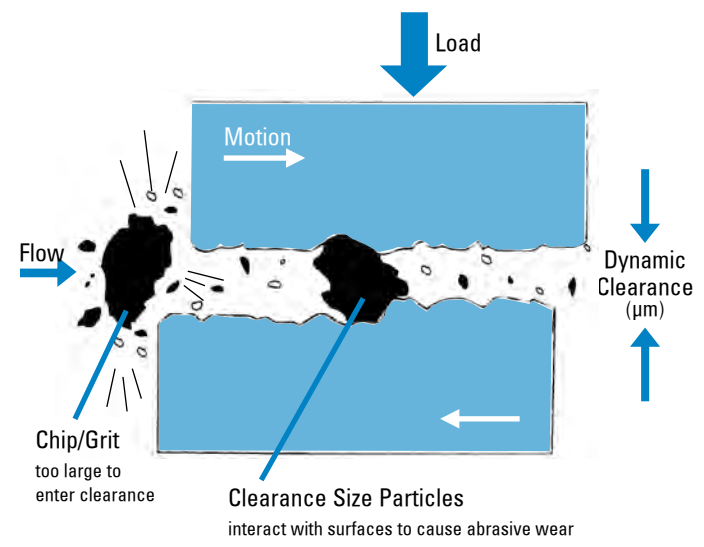
Ingressed or external contamination comes from the environment surrounding the system. Dirt can enter the hydraulic fluid supply through leaking seals, reservoir breather caps, and worn cylinder rod seals. Ingressed moisture, particularly, can cause long-term problems. As a hot system cools at night, 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 ingression or to remove water once it is present in a hydraulic or lube oil system. The best choice of technique for removal is dependant 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, as illustrated below. Widely used in industrial applications, 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, consult your fluid power supplier or a reputable manual.

Water Prevention/ 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

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Proper Filter Application

When selecting a filter or replacement element, 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 needed 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.

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.

System Characteristics to Consider When Specifying Filtration

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

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 fluid power 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 contains several different types of synthetic products considered as such because they contain neither petroleum oil nor 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 Sydrol® (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.

Donaldson

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.

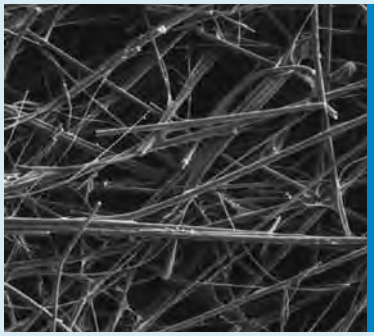
Basic Hydraulic Filtration Principles

Filter Media

Media is a term used to describe any material used to filter particles out of a fluid flow stream. There are four basic types used to remove contamination in hydraulic applications:

A. Synthetic Media

Synthetic fibers are man-made, smooth and rounded of provide the least resistance to flow. Their consistent shape allows us to control the fiber size and distribution pattern throughout the media mat to create the smoothest, least inhibited fluid flow.



Donaldson's Synthetic Media: Synteq®

Photo of Donaldson Synteq® synthetic filter media as seen magnified hundreds of times under the scanning electron microscope. The smooth rounded fibers provide low resistance to 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 at removing specified contaminants (e.g., 4 µm) and maximum dirt holding capacity.

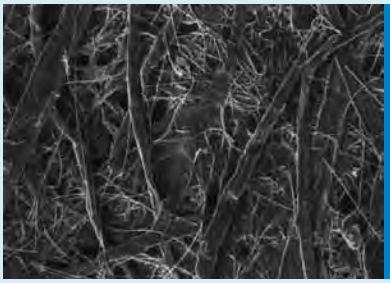
The low resistance of synthetic media to fluid flow makes it ideal for synthetic fluids, water glycols, water/oil emulsions, HWCF, and petroleum-based fluids.

B. Cellulose Media

Cellulose fibers are actually wood chips, microscopic in size and held together by resin. As you see in the photo below, the fibers are irregular in both shape and size.

Celluose often has lower beta ratings, which means there are smaller pores in the media. Smaller media pores cause more flow resistance, in turn causing 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.



Cellulose filter media photo from scanning electron microscope magnified hundreds of times.

C. Water Removal Media

This is media formulated with dessicants and resins to remove moisture and condensation from petroleum-based fluids. (For concentration of water greater than half of 1 percent (0.05%) in the hydraulic oil, we recommend you use a vacuum dehydrator unit.)

D. Wire-Mesh Media

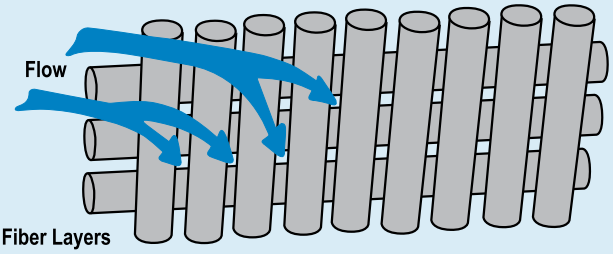
Wire-mesh media consists of stainless steel, epoxy-coated wire mesh available in 3 mesh sizes:

- 100 mesh yields 150 µm filtration
- 200 mesh yields 74 µm filtration
- 325 mesh yields 44 µm 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.

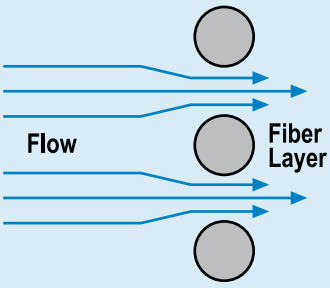
How Filter Media Functions In a Filtration System

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.

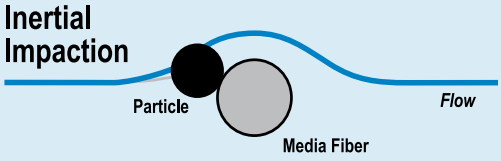
Looking at a cross-section view of the fibers, we can see how the flowstream is accelerated as it flows into the spaces between the fibers.



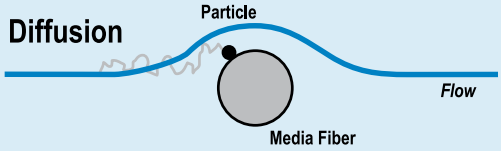
How Filter Media Collects Particles

There are four basic ways media captures particles.

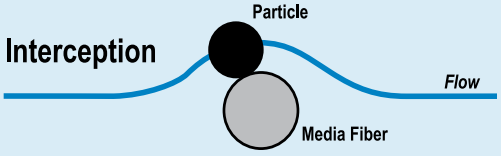
The first, called **inertia**, works on large, heavy particles suspended in the flow stream. These particles are heavier than the fluid surrounding them. As the fluid changes direction to enter the fiber space, the particle continues in a straight line and collides with the media fibers where it is trapped and held.



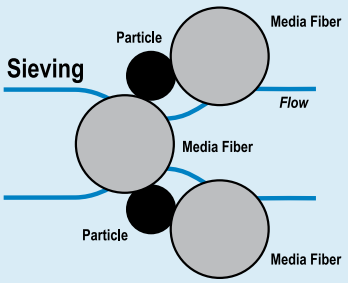
The second way media can capture particles is by **diffusion**. Diffusion works on the smallest particles. Small particles are not held in place by the viscous fluid and diffuse within the flow stream. As the particles traverse the flow stream, they collide with the fiber and are collected.



The third method of particle entrapment is call **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.



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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 element. 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.

Fluid to be Filtered	Recommended Media
Petroleum-based	Synteq Cellulose
Phosphate Ester	Synteq
Diester	Synteq
Water Glycol	Synteq
Water-Oil Emulsion	Synteq
Biodegradable Fluid	Synteq
HWCF (high water content fluids)	Synteq
Coarse Filtration	Wire Mesh

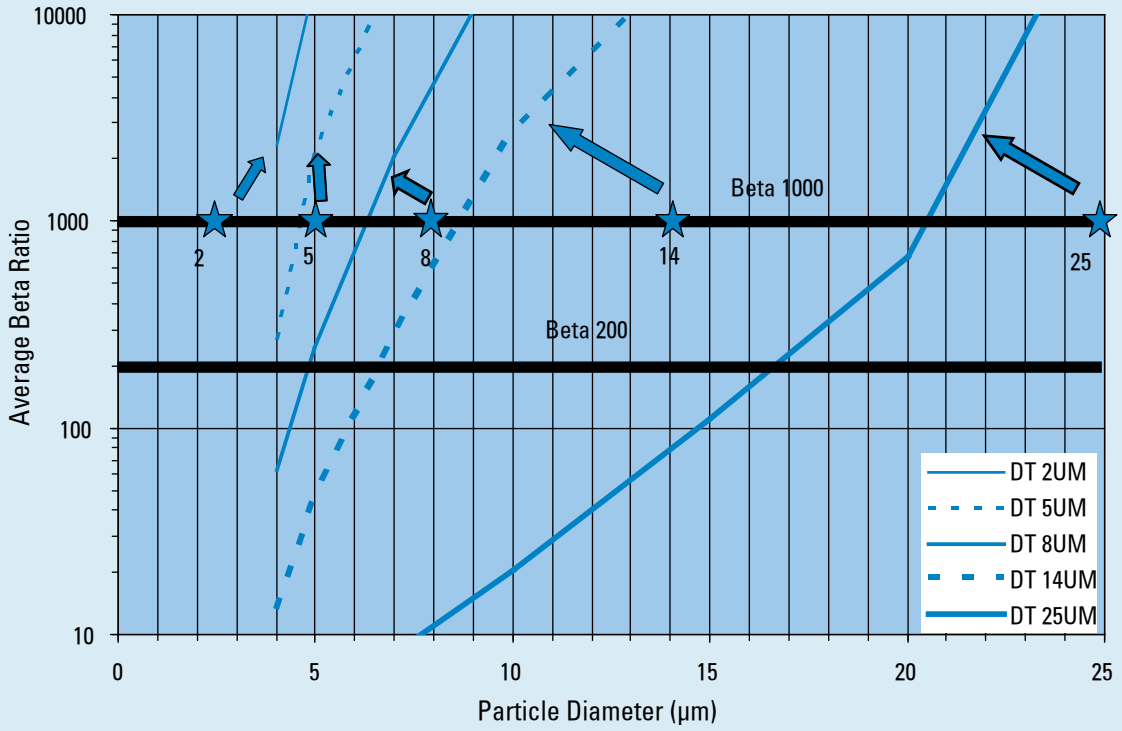
NEW Donaldson Filter Media Efficiency Ratings Per ISO 16889 Test Standards

Media Number	FORMER Rating $Beta_X$=75 per ISO 4572	NEW Rating $Beta_{X(C)}$=200 per ISO 16889	NEW Rating $Beta_{X(C)}$=1000 per ISO 16889
Donaldson Synteq® Synthetic Media			
No. ½	2 µm	<4 $\mu m_{(c)}$	<4 $\mu m_{(c)}$
No. 1	3 µm	4 $\mu m_{(c)}$	6 $\mu m_{(c)}$
No. 2	5 µm	5 $\mu m_{(c)}$	9 $\mu m_{(c)}$
No. 2½	10 µm	8 $\mu m_{(c)}$	10 $\mu m_{(c)}$
No. 3	15 µm	12 $\mu m_{(c)}$	14 $\mu m_{(c)}$
No. 4	16 µm	15 $\mu m_{(c)}$	20 $\mu m_{(c)}$
No. 6	13 µm	10 $\mu m_{(c)}$	13 $\mu m_{(c)}$
No. 9	22 µm	18 $\mu m_{(c)}$	23 $\mu m_{(c)}$
No. 16	37 µm	16 $\mu m_{(c)}$	22 $\mu m_{(c)}$
No. 20	40 µm	>50 $\mu m_{(c)}$	>50 $\mu m_{(c)}$
Donaldson Cellulose Media			
No. 3	16 µm	18 $\mu m_{(c)}$	24 $\mu m_{(c)}$
No. 10	25 µm	19 $\mu m_{(c)}$	23 $\mu m_{(c)}$
No. 15	35 µm	25 $\mu m_{(c)}$	29 $\mu m_{(c)}$
No. 25	N/A	32 $\mu m_{(c)}$	>40 $\mu m_{(c)}$
Donaldson Wire Mesh Media			
No. 44	45 µm nominal		
No. 74	75 µm nominal		
No. 149	150 µm nominal		
Donaldson Triboguard™ Synteq Synthetic Media			
DT 2UM	N/A	<4 $\mu m_{(c)}$	<4 $\mu m_{(c)}$
DT 5UM	N/A	4 $\mu m_{(c)}$	5 $\mu m_{(c)}$
DT 8UM	N/A	6 $\mu m_{(c)}$	8 $\mu m_{(c)}$
DT 14UM	N/A	10 $\mu m_{(c)}$	14 $\mu m_{(c)}$
DT 25UM	N/A	20 $\mu m_{(c)}$	25 $\mu m_{(c)}$

NEW! Donaldson Triboguard™ Synteq® Media

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. The Donaldson Triboguard 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 Triboguard Synteq Media



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Hydraulic Filtration Pressure Drop

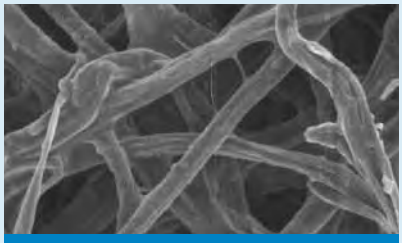
The difference between the inlet pressure and the outlet pressure is called pressure drop or differential pressure. It's symbolized by ΔP. ΔP is an irrecoverable loss of total pressure caused by the filter, and is mostly due to frictional drag on the fibers in the media.

ΔP may increase as the particulate rating or efficiency of the filter (as expressed by its beta ratio) gets better. ΔP also increases as the filter is being loaded with contaminant.

Four Major Factors Contribute to Pressure Drop

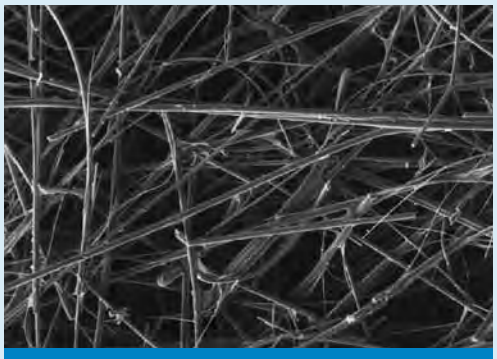
1. Filter Media

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.



Natural Fiber Cellulose media, as seen under the scanning electron microscope.

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®.



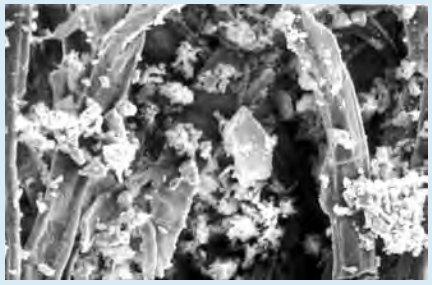
Donaldson's synthetic Synteq filter media — photo from scanning electron microscope — magnified hundreds of times.

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.e., 4 µm) 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 ΔP 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.

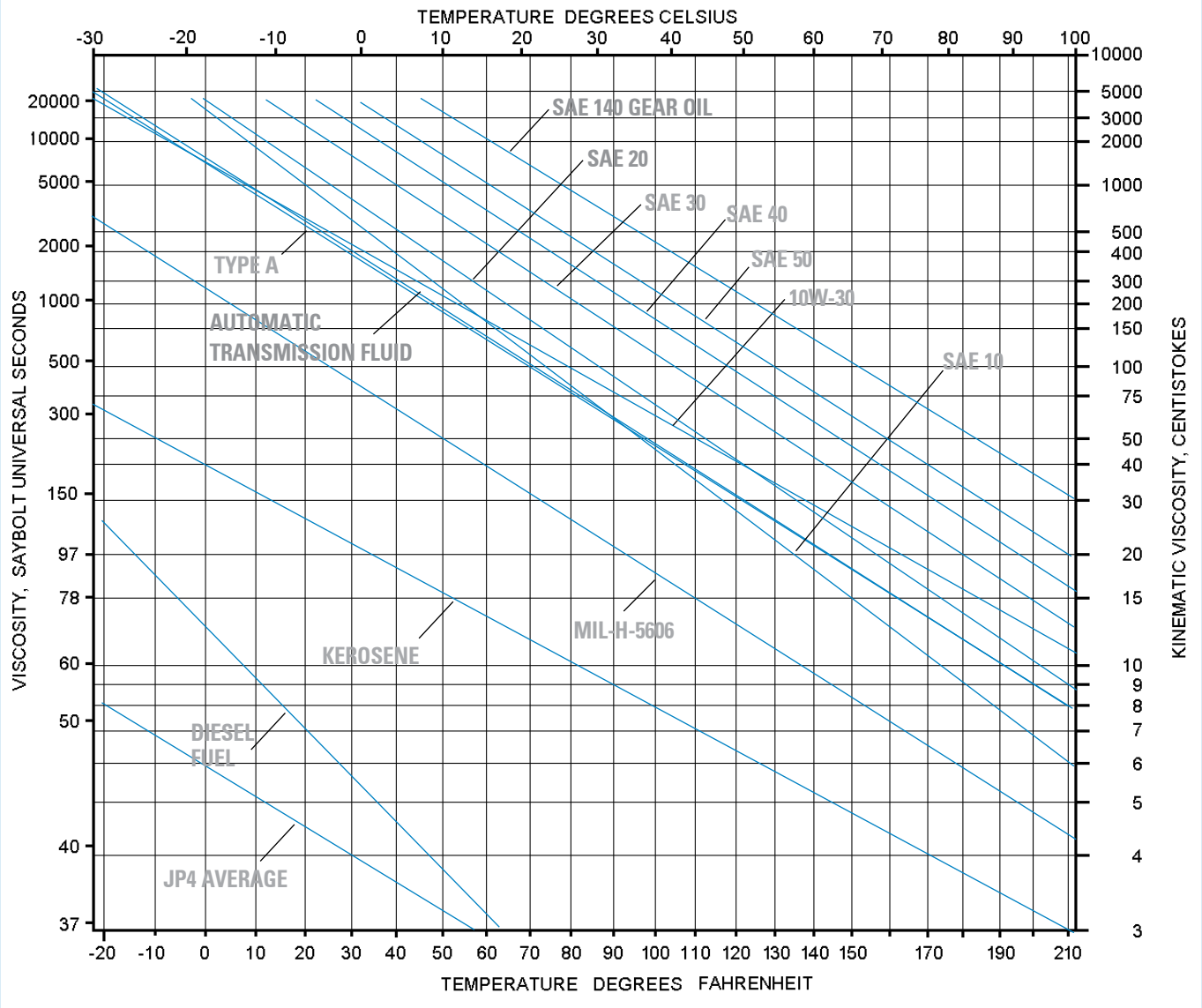
4. Fluid Viscosity

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 elements. 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



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Physical Characteristics of Elements

There are two main differences in filter elements. The first is the design of the filter element itself, and the second is the type of media that is used in such elements.

Filter elements 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 componets are glued or potted together.

- **Liners** must be structurally sturdy to withstand pressure variance, yet open enough to allow good flow.
- **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 BunaN 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.
- **Media potting** is key since it holds the media in place at each end. 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 elements that must perform in higher temperature environments, phosphate ester fluids and some high water based fluids.

Inside the element, the filter 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 a filter element (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.

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Combining the ISO Rating and Filter Performance Ratings

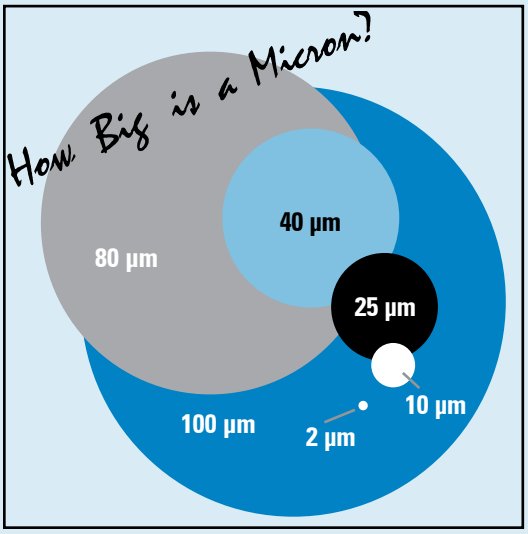
While filter manufacturers publish beta ratings for filter media to describe efficiency performance levels, a direct connection between the beta rating scale and the ISO rating scale cannot be made.

The solution is monitoring filter media performance at removing particles in the 4 µm, 6 µm, and 14 µm ranges. Oil 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 246), 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
Pumps		
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
Varibale Piston Pump	17/15/13	16/14/12
Valves		
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*
Actuators		
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

Disaster Strikes

When filters are not a main component of the hydraulic circuit, disaster awaits. Here, piston rings were eaten away by contaminants.

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Media Application Guide and ISO Rating System

The Application Guide for Donaldson Filter Media on page 246 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, 10^2, 10^3, 10^4, 10^5 and 10^6. (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 246, 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.

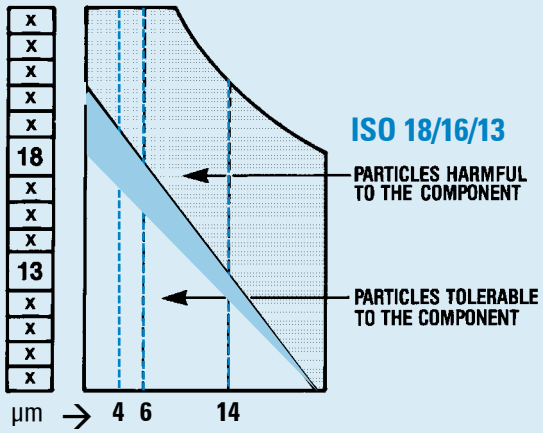
2) Place a dot on the vertical 6 µm line horizontally even with the 16 box of the ISO code.

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
24	80,000	160,000
23	40,000	80,000
22	20,000	40,000
21	10,000	20,000
20	5,000	10,000
19	2,500	5,000
18	1,300	2,500
17	640	1,300
16	320	640
15	160	320

Code	More Than	Up to & Including
14	80	160
13	40	80
12	20	40
11	10	20
10	5	10
9	2.5	5
8	1.3	2.5
7	.64	1.3
6	.32	.64

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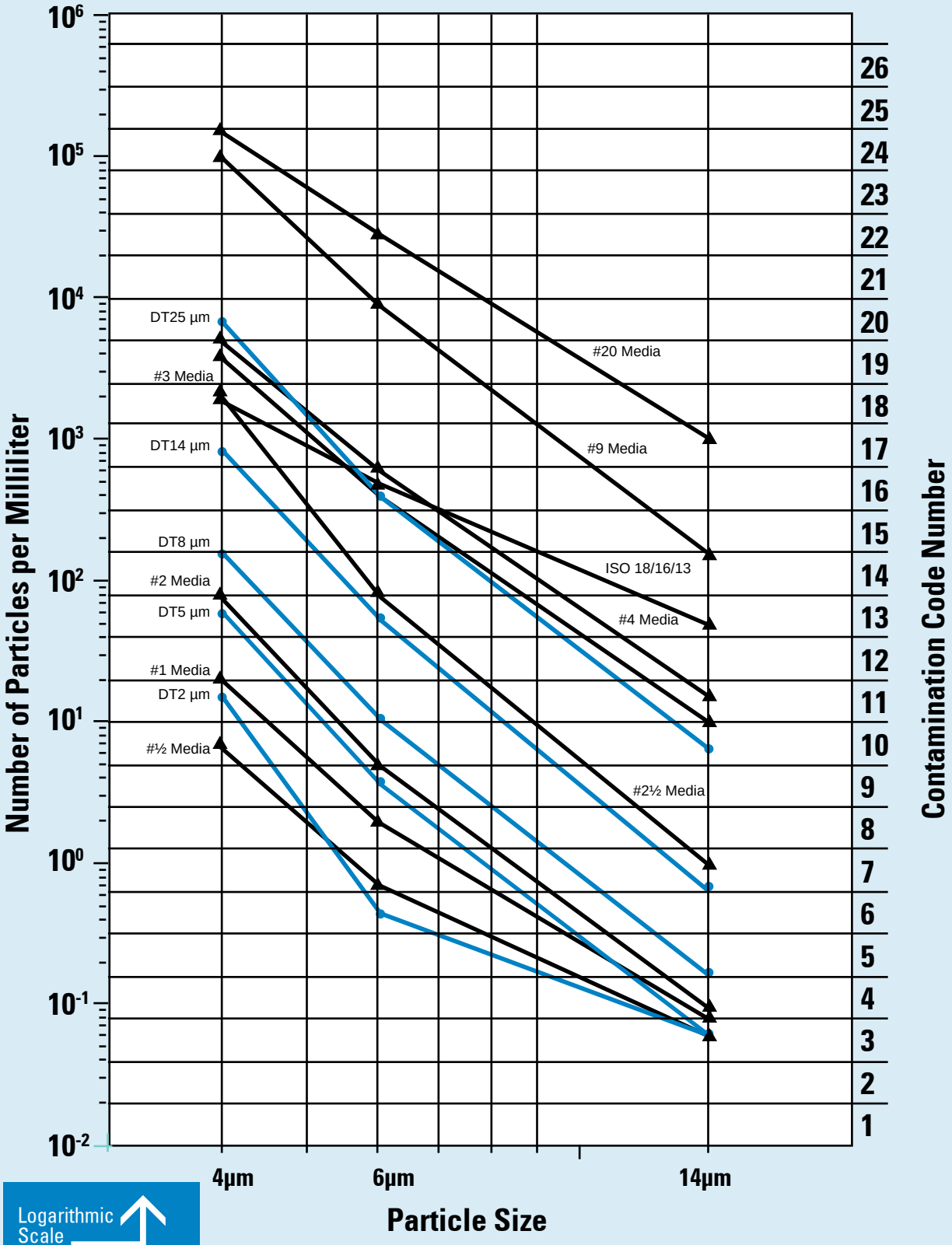
Application Guide for Donaldson Filter Media



Logarithmic Scale

This represents the number of particles at a given size in the oil sample

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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 ß) 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

$$ß_{10(c)} = 1000$$

1000 times more particles upstream than downstream that are 10 µm 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 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 1 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.

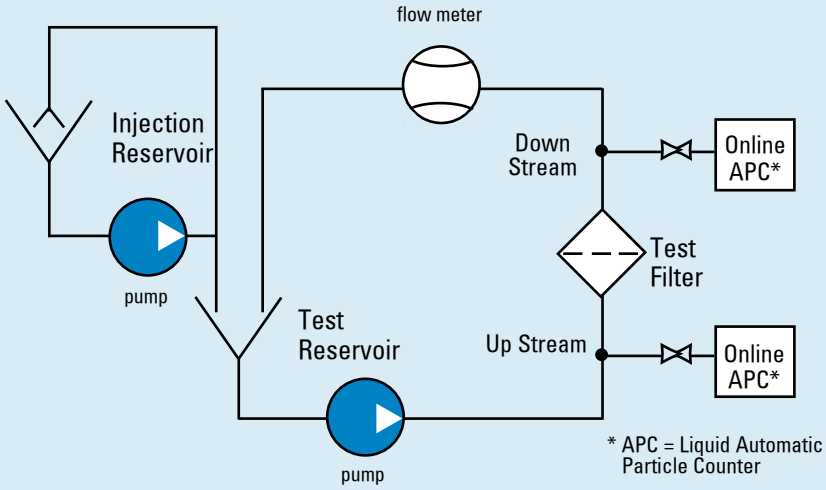
NIST provides calibration suspension, which is certified with X number of particles at a certain size. This is verified by NIST. The new way to list beta ratios includes a subscript (c) to indicate NIST certified test suspension and assures you of traceability and repeatability.

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

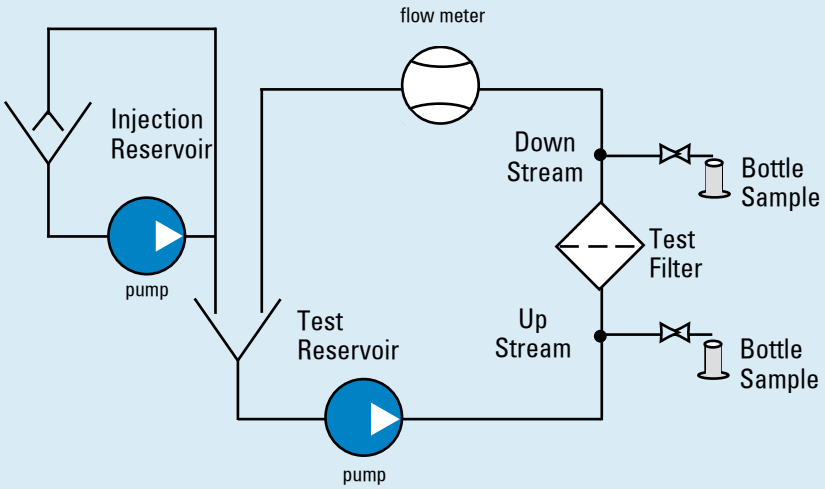
ACFTD calibrated size (µm) per ISO 4402 corresponds to a NIST-calibrated size [$\mu m_{(c)}$] per ISO 11171

ACFTD	0.8	1	2	2.7	3	4.3	5	7	10	12	15	15.5	20	25	30	40	50
NIST	4	4.2	4.6	5	5.1	6	6.4	7.7	9.8	11.3	13.6	14	17.5	21.2	24.9	31.7	38.2



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)

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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 element.
- 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, 5mm-80mm) 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: $ß_{4(c)}$ =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: $ß_{5(c)}$ =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.

NEW Donaldson Filter Media Efficiency Ratings Per ISO 16889 Test Standards

Media Number	FORMER Rating $Beta_x$=75 per ISO 4572	NEW Rating $Beta_{x(c)}$=200 per ISO 16889	NEW Rating $Beta_{x(c)}$=1000 per ISO 16889
Donaldson Synteq® Synthetic Media			
No. ½	2 µm	<4 $µm_{(c)}$	<4 $µm_{(c)}$
No. 1	3 µm	4 $µm_{(c)}$	6 $µm_{(c)}$
No. 2	5 µm	5 $µm_{(c)}$	9 $µm_{(c)}$
No. 2½	10 µm	8 $µm_{(c)}$	10 $µm_{(c)}$
No. 3	15 µm	12 $µm_{(c)}$	14 $µm_{(c)}$
No. 4	16 µm	15 $µm_{(c)}$	20 $µm_{(c)}$
No. 6	13 µm	10 $µm_{(c)}$	13 $µm_{(c)}$
No. 9	22 µm	18 $µm_{(c)}$	23 $µm_{(c)}$
No. 16	37 µm	16 $µm_{(c)}$	22 $µm_{(c)}$
No. 20	40 µm	>50 $µm_{(c)}$	>50 $µm_{(c)}$
Donaldson Cellulose Media			
No. 3	16 µm	18 $µm_{(c)}$	24 $µm_{(c)}$
No. 10	25 µm	19 $µm_{(c)}$	23 $µm_{(c)}$
No. 15	35 µm	25 $µm_{(c)}$	29 $µm_{(c)}$
No. 25	N/A	32 $µm_{(c)}$	>40 $µm_{(c)}$
Donaldson Wire Mesh Media			
No. 44	45 µm nominal		
No. 74	75 µm nominal		
No. 149	150 µm nominal		
Donaldson Triboguard™ Synteq Synthetic Media			
DT 2UM	N/A	<4 $µm_{(c)}$	<4 $µm_{(c)}$
DT 5UM	N/A	4 $µm_{(c)}$	5 $µm_{(c)}$
DT 8UM	N/A	6 $µm_{(c)}$	8 $µm_{(c)}$
DT 14UM	N/A	10 $µm_{(c)}$	14 $µm_{(c)}$
DT 25UM	N/A	20 $µm_{(c)}$	25 $µm_{(c)}$

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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 ingression 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

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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.

	Recommended Filter Media		
Petroleum-Based (Hydrocarbon) Fluids	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 BunaN are appropriate for most applications involving petroleum oil and some high water content fluids. Filters with seals made of Viton® or Fluorel® (both fluoroelastomers) are required when using diesters, phosphate ester fluids. Donaldson offers both types. (Viton is a registered trademark of DuPont Dow Elastomers, and Fluorel is a registered trademark of 3M Company.) EPR (ethylene propylene rubber) seals are required for use with Skydrol® and Skydrol 500 fluids. (Skydrol is a registered trademark 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.

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How to Best Position Filters in Your Hydraulic Circuit

Within every industrial 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.

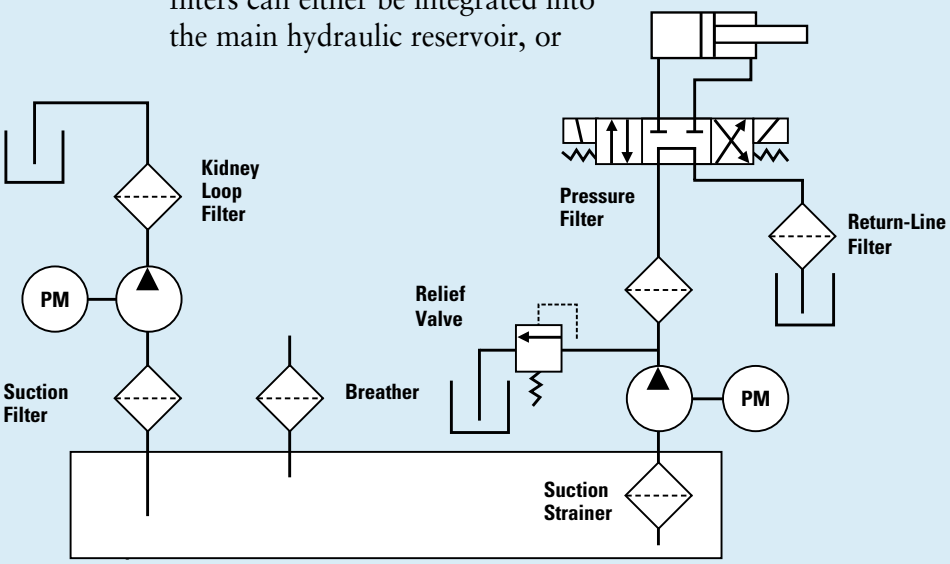
Note that kidney loop filters do not directly protect components — rather, their main function is to polish the oil to a very clean condition. It's also important to remember that an additional pump and motor will be required.

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.



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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.

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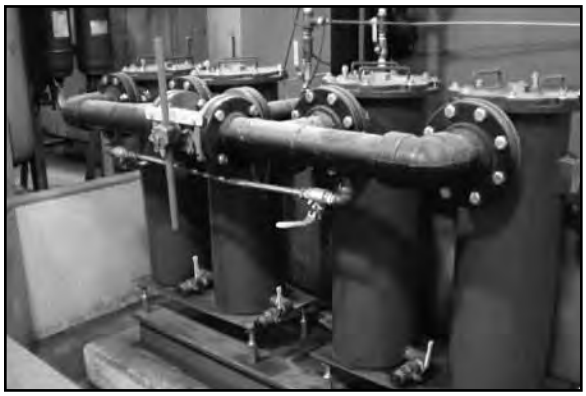
HRK10 at a Paper Mill



T.R.A.P.™ at a Coal Plant

HRK10 Duplex

Industry: Paper

Problem: Collapsing Competitive Filter Elements on PMO Circuit

Solution: Donaldson HRK10 Duplex
Donaldson Triboguard Elements

Recently, 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, resulting 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 Triboguard filter elements. Four HRK10 units were configured in a duplex arrangement. Donaldson Triboguard ß5$_{(c)}$=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. 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 from Donaldson that provides unbeatable system protection and lasts longer.

By installing T.R.A.P. breather filters on its gearboxes last February, 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.

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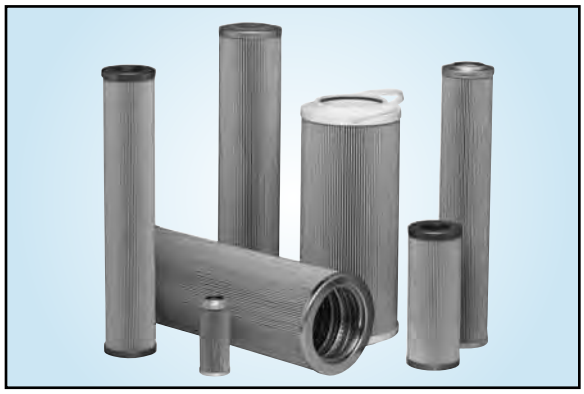
HRK10 for Bulk Lube

DT Elements at an Injection Molder



HRK10 Housings

Industry: Bulk Lube Oil Filtration

Problem: Develop High Flow Bulk Oil Filtration System

Solution: Donaldson HRK10 Assemblies

One commonly overlooked source of contamination is when new fluid is added to a system. Unfortunately, the best-laid plans for keeping hydraulic oil clean through filtration can be defeated when fresh fluid added to a system is not as clean as the fluid already in the system. A Midwestern manufacturer of synthetic lubricants recently expanded their production area. They partnered with a control systems integrator for mechanical process design. Donaldson recommended the installation of 30 new HRK10 assemblies to maintain the production times and fine micron standards the manufacturer demanded. Modified HRK10 housing were supplied to better fit the manufacturer's piping scheme.

The HRK10 was selected, according to the systems integrator, because "it allows relocating the outlet port without significant delay in building the housings." Additionally there will be a "boost in productivity by reducing the changeover time." The HRK10s feature the new Donaldson Triboguard Synteq® media. The manufacturer's VP of Operations explained that they "require filtration specifications to exceed industry standards, and are met with the Synteq media. These filters last 1.6 times longer than our old filters, which offset the price difference and ensures the cost-effectiveness of filtering our synthetic lubricants to the highest quality."

Donaldson Triboguard™ Elements

Industry: Injection Molding

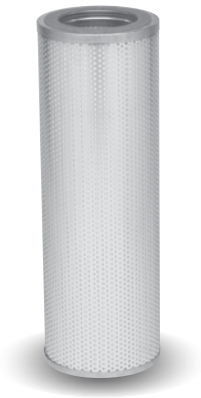
Problem: Short Servo Valve Life

Solution: Donaldson Triboguard High Efficiency Element

Donaldson Triboguard 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 measured in months led to a drastic change to their maintenance procedures, including: new oil, moisture removal breathers, side-loop cleanup systems, and Donaldson Triboguard™ pressure line filters.

In side-by-side tests the injection molder compared their existing supplier's hydraulic pressure line elements with Donaldson Triboguard <4 µm(c) rated filters. Oil analysis proved that by using the Donaldson Triboguard 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.

DT Synteq™ XP Elements at a Brass Mill



New Donaldson Triboguard™ Synteq XP Elements

Industry: Primary Metals Mill

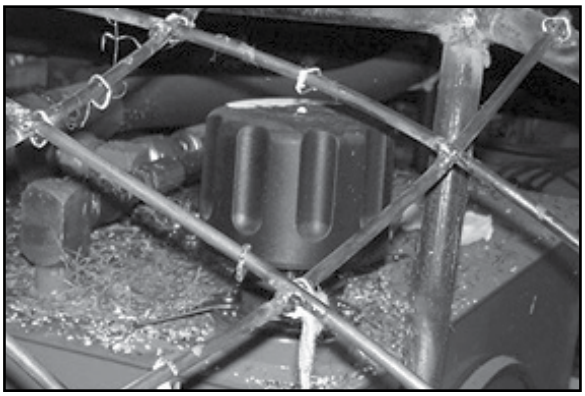
Problem: Short Life on Rolling Oil Filtration Circuit

Solution: Donaldson Triboguard Synteq XP Long Life Elements

A primary metals mill was experiencing short life in their rolling and coolant oil filtration system. The filtered oil system helps to provide a clean surface finish for their metal production in addition to the rolling and cooling functions, using 6" x 18" and 6" x 36" industrial cartridge elements filtering a Conoco Phillips oil. Without proper filtration the metal product would fail their product cleanliness specifications. The mill was dissatisfied with the filter life from their previous supplier, which ranged from 7 to 10 days on average. They decided to try new Donaldson Triboguard elements with Synteq XP media as a means of extending their filter service interval.

The 2 µm XP grade was selected, which typically provides a $\beta<4_{(c)} > 1000$ efficiency according to ISO 16889 multi-pass tests. Refer to the chart above. The results of trials with the 2 µm XP media included an astounding improvement to 3 to 4 weeks between filter changes. The mill averaged a 3-fold improvement in life over their previous filter supplier. The mill operators immediately switched to Synteq XP for their filtration system needs.

T.R.A.P.™ Parade Float Hydraulics



T.R.A.P. Breathers

Industry: Specialty Hydraulics

Problem: Water Condensation in Hydraulic Reservoirs During Storage

Solution: Donaldson T.R.A.P. Breathers

Parade floats have become more spectacular and sophisticated every year. Float builders have incorporated motion control as far back as the 1940s. Hydraulics has become the method of choice for motion control systems because of their high torque and force transmission in a small package size. Typically, systems are dismantled and reservoirs stored between uses. Consequently, changes in ambient temperature and humidity have caused water to condense in the fluid. In the past, technicians would use a water removal system to extract the accumulated water from the reservoir, which was more practical than completely draining the oil.

More recently a Southwest US-based float designer tried a new solution suggested by a Donaldson Distributor. T.R.A.P. moisture adsorbing breathers were installed on the reservoirs. These breathers capture moisture from the atmosphere as air is drawn into the reservoir. Warm, dry air exiting the reservoir removes the adsorbed moisture and expels it back into the atmosphere. In the 2008 Tournament of Roses Parade, five of the float designers entries were T.R.A.P. equipped. These were placed on 60 gallon (227 l) reservoirs operating with 40 gpm (151 lpm) pumps.

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DX2 Element at a Steel Mill

DX2™ Dual Element

Industry: Primary Metals Mill

Problem: Short Filter Life on Galvanizing Line

Solution: Donaldson Triboguard™ DX2™ Metal-Free Dual Elements

On a South African Steel Mill's galvanizing line, previous cleanliness levels ranged between 18/16/12 and 20/19/15 using a 3 µm filter. They installed a 14 µm DX2 element partly to see the performance parameters at that level, and secondly to allow for a decrease in micron ratings later on. Final cleanliness levels dropped to a 15/13/10, a 15 to 20-fold improvement in cleanliness, which is pretty staggering. Another galvanizing line and a continuous annealing line showed similar results. The second galvanizing line went from a range of 16/14/11 to 17/15/12 using a 3 µm filter to a level of 16/14/10 with the DX2 14 um element.

An even greater level of reduction was demonstrated on the continuous annealing line. Here the original ISO codes ranged from 18/16/9 to as high as 22/20/15 when problems occurred. The 14 µm rated DX2 brought the cleanliness down to 17/15/8. Even more astonishing is the fact that the DX2 elements lasted four times longer than the previous standard elements. "In terms of total cost of ownership, this reduces the direct cost price by 53%, along with proven cleanliness levels." Added to this is savings on service time and associated costs, and most importantly, the true value of the program lies in savings to be obtained from improved cleanliness levels and increased component 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."

All cartridge filter elements in this catalog are sorted by part number.

Element Part No.	Assembly Where Used	Element Part No.	Assembly Where Used
P160078	HEK11	P167188	HPK04
P160700	HDK06	P167410	TI25
P161016	HDK06	P167425	TI25
P161571	HDK06	P167514	TI25
P162233	HPK03 / HPK04 / FPK04	P167838	HPK02 / W440 / FPK02
P163472	HEK11	P167841	HPK05
P163903	TI25 / W451	P167842	W061 / W350 / HPK03 / HPK04 / FPK04
P163910	TI25 / W451	P167843	W350 / FPK04
P163945	HFK08	P169341	TI25 / W451
P164164	W061 / HPK03 / FPK04	P169344	TI25 / W451
P164166	W061 / W350 / HPK03 / HPK04 / FPK04	P169429	HPK02 / W440 / FPK02
P164168	W061 / FPK04	P169431	W061 / HPK03 / FPK04
P164170	HPK04	P169432	W061 / FPK04
P164172	W061 / HPK03 / FPK04	P169433	HPK04
P164174	W061 / W350 / HPK03 / HPK04 / FPK04	P171037	HPK05
P164176	W061 / FPK04	P171279	HEK11
P164178	HPK04	P171500	FIK03
P164227	HPK05	P171501	FIK03
P164229	HPK05	P171502	FIK03
P164365	HPK03 / HPK04 / FPK04	P171503	FIK03
P164367	HPK04	P171504	FIK03
P164405	HFK08	P171505	FIK03
P164407	HFK08	P171524	FIK04
P164435	HPK05	P171525	FIK04
P164585	HPK05	P171526	FIK04
P164592	W061 / HPK03 / FPK04	P171527	FIK04
P164594	W061 / W350 / HPK03 / HPK04 / FPK04	P171528	FIK04
P164596	W061 / FPK04	P171529	FIK04
P164598	HPK04	P171530	FIK04
P164601	HPK03 / HPK04 / FPK04	P171531	FIK04
P164603	HPK04	P171532	FIK04
P164697	HDK06	P171533	FIK04
P164699	HDK06	P171534	FIK04
P164701	HFK08	P171535	FIK04
P164703	HFK08	P171536	FIK05
P164707	HEK11	P171537	FIK05
P165006	HPK02 / W440 / FPK02	P171538	FIK05
P165015	HPK02 / W440 / FPK02	P171539	FIK05
P165041	HPK02 / W440 / FPK02	P171540	FIK05
P165043	HPK02 / W440 / FPK02	P171541	FIK05
P165136	HPK02 / W440 / FPK02	P171554	FIK07
P165138	HPK02 / W440 / FPK02	P171555	FIK07
P165319	HPK03 / HPK04 / FPK04	P171556	FIK07
P165449	HEK11	P171557	FIK07
P165628	HDK06	P171558	FIK07
P166462	HFK08	P171559	FIK07
P166597	HDK06	P171572	FIK07
P167180	HPK02 / W440 / FPK02	P171573	FIK07
P167181	HPK02 / W440 / FPK02	P171574	FIK07
P167182	HPK02 / W440 / FPK02	P171575	FIK07
P167183	HPK02 / W440 / FPK02	P171576	FIK07
P167184	W350 / FPK04	P171577	FIK07
P167185	W350 / HPK03 / HPK04 / FPK04	P171578	FIK07
P167186	W350 / HPK03 / HPK04 / FPK04	P171579	FIK07
P167187	HPK04	P171580	FIK07

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All cartridge filter elements in this catalog are sorted by part number.

Element Part No.	Assembly Where Used	Element Part No.	Assembly Where Used
P171581	FIK07	DT-9020-8-8UM	HPK02 / W440 / FPK02
P171582	FIK07	DT-9020-8-14UM	HPK02 / W440 / FPK02
P171583	FIK07	DT-9020-8-25UM	HPK02 / W440 / FPK02
P171830	FIK03	DT-9600-4-2UM	W061/ W350 / FPK04
P171831	FIK04	DT-9600-4-5UM	W061/ W350 / FPK04
P171833	FIK03	DT-9600-4-8UM	W061/ W350 / FPK04
P171834	FIK04	DT-9600-4-14UM	W061/ W350 / FPK04
P171836	FIK03	DT-9600-4-25UM	W061/ W350 / FPK04
P171837	FIK04	DT-9600-8-2UM	W061 / W350 / HPK03 / HPK04 / FPK04
P171839	FIK03	DT-9600-8-5UM	W061 / W350 / HPK03 / HPK04 / FPK04
P171840	FIK04	DT-9600-8-8UM	W061 / W350 / HPK03 / HPK04 / FPK04
P171842	FIK03	DT-9600-8-14UM	W061 / W350 / HPK03 / HPK04 / FPK04
P171843	FIK04	DT-9600-8-25UM	W061 / W350 / HPK03 / HPK04 / FPK04
P171845	FIK03	DT-9600-13-2UM	W061 / FPK04
P171846	FIK04	DT-9600-13-5UM	W061 / FPK04
P172434	FIK04	DT-9600-13-8UM	W061 / FPK04
P173330	FIK03	DT-9600-13-14UM	W061 / FPK04
P173573	HFK08	DT-9600-13-25UM	W061 / FPK04
P173780	TI25	DT-9600-16-2UM	HPK04
P173781	TI25	DT-9600-16-5UM	HPK04
P174245	W451	DT-9600-16-8UM	HPK04
P174247	W451	DT-9600-16-14UM	HPK04
P174249	W451	DT-9600-16-25UM	HPK04
P174260	W451	DT-8300-16-2UM	W041 / W042
P174268	W451	DT-8300-16-5UM	W041 / W042
P174622	TI25	DT-8300-16-8UM	W041 / W042
P174623	TI25	DT-8300-16-14UM	W041 / W042
P174624	TI25	DT-8300-16-25UM	W041 / W042
P176137	HPK05	DT-8300-39-2UM	W041 / W042
P176221	HDK06	DT-8300-39-5UM	W041 / W042
P176222	HFK08	DT-8300-39-8UM	W041 / W042
P176223	HEK11	DT-8300-39-14UM	W041 / W042
P176417	HEK11	DT-8300-39-25UM	W041 / W042
DX2-9600-8-14UM	W061/ W350 / HPK03 / HPK04 / FPK04	DT-8310-16-2UM	W041 / W042
DX2-9600-8-5UM	W061/ W350 / HPK03 / HPK04 / FPK04	DT-8310-16-5UM	W041 / W042
DX2-9600-8-8UM	W061/ W350 / HPK03 / HPK04 / FPK04	DT-8310-16-8UM	W041 / W042
DX2-9600-13-14UM	W061 / FPK04	DT-8310-16-14UM	W041 / W042
DX2-9600-13-5UM	W061 / FPK04	DT-8310-16-25UM	W041 / W042
DX2-9600-13-8UM	W061 / FPK04	DT-8310-39-2UM	W041 / W042
DX2-9600-16-14UM	HPK04	DT-8310-39-5UM	W041 / W042
DX2-9600-16-5UM	HPK04	DT-8310-39-8UM	W041 / W042
DX2-9600-16-8UM	HPK04	DT-8310-39-14UM	W041 / W042
P566187	HRK10	DT-8310-39-25UM	W041 / W042
P566188	HRK10	DT-HF4-9-5UM	TI25 / W451
P566189	HRK10	DT-HF4-9-8UM	TI25 / W451
P566190	HRK10	DT-HF4-9-14UM	TI25 / W451
P566191	HRK10	DT-HF4-9-25UM	TI25 / W451
P566192	HRK10	DT-HF4-18-5UM	W451
DT-9020-4-2UM	HPK02 / W440 / FPK02	DT-HF4-18-8UM	W451
DT-9020-4-5UM	HPK02 / W440 / FPK02	DT-HF4-18-14UM	W451
DT-9020-4-8UM	HPK02 / W440 / FPK02	DT-HF4-18-25UM	W451
DT-9020-4-14UM	HPK02 / W440 / FPK02	DT-HF4-27-5UM	W451
DT-9020-4-25UM	HPK02 / W440 / FPK02	DT-HF4-27-8UM	W451
DT-9020-8-2UM	HPK02 / W440 / FPK02	DT-HF4-27-14UM	W451
DT-9020-8-5UM	HPK02 / W440 / FPK02	DT-HF4-27-25UM	W451

All cartridge filter elements in this catalog are sorted by part number.

Element Part No.	Assembly Where Used	Element Part No.	Assembly Where Used
DT-9021-4-5UM	HPK02 / W440 / FPK02	DT-HF4HC-9-14UM	W451
DT-9021-4-14UM	HPK02 / W440 / FPK02	DT-9400-26-2UM	HPK05
DT-9021-8-5UM	HPK02 / W440 / FPK02	DT-9400-26-5UM	HPK05
DT-9021-8-14UM	HPK02 / W440 / FPK02	DT-9400-26-8UM	HPK05
DT-9601-4-5UM	W350 / FPK04	DT-9400-26-14UM	HPK05
DT-9601-4-14UM	W350 / FPK04	DT-9400-26-25UM	HPK05
DT-9601-8-5UM	W350 / HPK03 / HPK04 / FPK04	DT-9901-26-5UM	HPK05
DT-9601-8-14UM	W350 / HPK03 / HPK04 / FPK04	DT-9901-26-14UM	HPK05
DT-9601-16-5UM	HPK04	P764183	FIK Combo
DT-9601-16-14UM	HPK04	P765657	FIK Combo
DT-HF4HC-9-5UM	W451		

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Bulletin No. HYD-100 06/09