Why Filter Fuels & Lubricants?

Today’s sophisticated equipment, such as diesel engines with increased injection pressures, requires higher cleanliness levels than ever before. Donaldson bulk filtration systems save on costly component replacement, prevent unplanned downtime and prevent a decrease in fuel efficiency due to injector wear. In short, Donaldson reduces your total cost of ownership. Learn more about all things related to diesel fuel at MyCleanDiesel.com.
Why do I Need Clean Fuel?

As diesel travels from refinery to terminal locations to local bulk storage and finally to your bulk tank, it picks up contamination that is **deadly to today’s engines.**

Your local distributor likely delivers diesel that meets or exceeds fuel-industry standards for cleanliness. This may **not be clean enough** for your equipment.

By filtering out dirt, water and other contaminants before your fuel ever touches your equipment, you’ll minimise costly downtime, **Keep Running** and **Achieve More.**

GET A CLEAN SOLUTION.

To ensure that you’re pumping clean, dry fuel into your equipment, call or email a Donaldson Clean Solutions expert. No matter where you are or the size of your operation, there’s a Clean Solution that will help you **Achieve More.**

---

**Why Do I Need Clean Fuel?**

To ensure that you’re pumping clean, dry fuel into your equipment, call or email a Donaldson Clean Solutions expert. No matter where you are or the size of your operation, there’s a Clean Solution that will help you Achieve More.

**DIESEL IS DIRTY.**

DIESEL IS DIRTY.

**DIRT IS BAD.**

DIRT IS BAD.

**REMOVE THE DIRT.**

REMOVE THE DIRT.

**ACHIEVE MORE.**

ACHIEVE MORE.

---

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### Achieving the Target Cleanliness of a Fluid

ISO 4406 contamination codes are a way to express fluid cleanliness. The three numbers correspond to the number of particles 4 microns and larger, 6 microns and larger, and 14 microns and larger present in the fluid. This page illustrates what it means to start with a contamination of ISO 22/21/18 and target a cleanliness of ISO 14/13/11.

#### ISO 4406 Contamination Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>More Than</th>
<th>Up To &amp; Including</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>8,000,000</td>
<td>16,000,000</td>
</tr>
<tr>
<td>23</td>
<td>4,000,000</td>
<td>8,000,000</td>
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<tr>
<td>22</td>
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<td>1,000,000</td>
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</tr>
<tr>
<td>20</td>
<td>500,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>19</td>
<td>250,000</td>
<td>500,000</td>
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<tr>
<td>18</td>
<td>130,000</td>
<td>250,000</td>
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<tr>
<td>17</td>
<td>64,000</td>
<td>130,000</td>
</tr>
<tr>
<td>16</td>
<td>32,000</td>
<td>64,000</td>
</tr>
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<td>15</td>
<td>16,000</td>
<td>32,000</td>
</tr>
<tr>
<td>14</td>
<td>8,000</td>
<td>16,000</td>
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<td>13</td>
<td>4,000</td>
<td>8,000</td>
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<tr>
<td>12</td>
<td>2,000</td>
<td>4,000</td>
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<td>11</td>
<td>1,000</td>
<td>2,000</td>
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<td>10</td>
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<td>7</td>
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<td>6</td>
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<td>5</td>
<td>16</td>
<td>32</td>
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<td>8</td>
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<td>4</td>
<td>8</td>
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<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

#### RECOMMENDED ISO CLEANLINESS RATINGS

- **ISO 22/21/18**: Typical cleanliness as fluid goes into your equipment.
- **ISO 14/13/11**: Target rating for diesel fuel.
- **ISO 18/16/13**: Target rating for hydraulic/transmission oils.
- **ISO 16/14/11**: Target rating for heavy gear/engine oils.

### Donaldson Delivers Water Protection

Are your bulk fluids passing large amounts of free water downstream—contaminating vehicles and equipment? Donaldson’s water absorbing filter with super absorbent polymer media, DBB0248, will stop flow if large amounts of free water are detected in your ethanol-free fluids. Designing systems with water absorbing filters requires careful sizing considerations. A Donaldson specialist will assist in configuring a system that meets your specific needs for flow and pressure drop.

### Choosing the Ideal Filters for Your System Doesn’t Need to be Complicated

1. Select the right filter to achieve targeted ISO cleanliness. Proper design of the system will help avoid unnecessary costs.
2. Determine the working pressure of the system and select the filter range compatible with that pressure.
3. Different types of fluids have different properties. Fluid viscosity plays an important role in restricting the flow through filters. Select a filter that has compatible media-to-fluid properties and will maintain adequate flow and avoid excessive pressure drops. See pages 18-19 for filter flow rates and pressure drops.
Clean.

Donaldson single-pass filtration on the inlet removes contamination before it can enter your storage tank. Compact and easy to replace, Donaldson filters are an important line of defense in maintaining fluid quality and can be configured for high flow rates while minimizing pressure drop.

Protect.

T.R.A.P.™ Breathers and Reservoir Air Dryers reduce the risk of moisture and contaminants entering a bulk storage tank so fluids are kept clean and dry. Used together, they’ll help guard fluids from free water, airborne contamination and microbial growth for as long as they stay in storage.

Polish.

Unstable fluids and the tank itself can be a source of contamination. Final filtration on the outlet with Donaldson filters ensures that targeted ISO cleanliness levels are achieved before fluids are pumped into your equipment.
Clean Diesel Kits

Donaldson Clean Diesel Kits are the answer to your fuel cleanliness worries. You can’t always control the cleanliness of diesel fuel delivered to you, but you can control how clean it is when you pump it into your vehicles and equipment. Donaldson Clean Diesel Kits are easy to install on any fuel dispenser and come with everything needed to filter out even the finest contaminants before they enter your equipment’s fuel system.

**FEATURES**
- Easy to install
- Provides filtration to ISO 14/13/11 diesel cleanliness in a single pass
- Recommended for all diesel and biodiesel blends

**APPLICATIONS**
- Diesel fuel dispensers
- Mobile service trucks
- Slip tanks

### FEATURES
- Easy to install
- Provides filtration to ISO 14/13/11 diesel cleanliness in a single pass
- Recommended for all diesel and biodiesel blends

### APPLICATIONS
- Diesel fuel dispensers
- Mobile service trucks
- Slip tanks

#### Series Filtration

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Max. Flow Range</th>
<th>Fluid Compatibility</th>
<th>Target ISO Cleanliness</th>
<th>Micron Rating &amp; Efficiency</th>
<th>Working Pressure</th>
<th>Element Collapse Pressure</th>
<th>Replacement Filter Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>X900098 P506073 X900096 X900081 X900097</td>
<td>121 lpm 189 lpm 189 lpm 375 lpm 375 lpm</td>
<td>All diesel fuels</td>
<td>16/14/11 14/13/11 16/14/11 14/13/11 16/14/11</td>
<td>7 micron @ Beta 2000 4 micron @ Beta 2000 7 micron @ Beta 2000 4 micron @ Beta 2000 7 micron @ Beta 2000</td>
<td>350 ps / 2413 kPa / 24.1 bar</td>
<td>150 ps / 1034 kPa / 10.3 bar</td>
<td>DBB7733 Compact Fuel Filter DBB8866 Fuel Filter &amp; DBB0248 Water Absorbing Filter DBB8877 Fuel Filter &amp; DBB0248 Water Absorbing Filter DBB8866 Fuel Filter &amp; DBB0248 Water Absorbing Filter DBB8877 Fuel Filter &amp; DBB0248 Water Absorbing Filter</td>
</tr>
</tbody>
</table>

**For complete protection**

We recommend installing a T.R.A.P. Breather to keep airborne contamination and moisture from entering your tank. Always confirm the selected breather is suitable for application flow rates and tank specification. Select from one of the following:

- **Mobile Tanks**
  - Fixed Tanks to 1000 Litres
    - P767025 - 1/2" BSP Anti-splash
    - P664669 - 1" NPT
  - Fixed Tanks over 1000 Litres
    - P923076 - T.R.A.P. Breather Filter
    - P900113 - T.R.A.P. Breather Assembly

**Clean Diesel Carts**

Clean Diesel Carts are the perfect solution for fuel transfer and kidney loop applications.

We offer convenient portable packages which enable off-line filtration to supplement existing filtration to achieve system cleanliness. Use with fixed industrial or mobile equipment to achieve and maintain proper ISO cleanliness levels.

### Clean Diesel Carts

#### Part Number
- Bu.F.S.S Bulk Fuel Service System: P506057
- Bu.F.S.S. 12V Bulk Fuel Service System: XD1408
- B.O.S.S. Bulk Oil Service System: P506037
- B.O.S.S. Lite Bulk Oil Service System: P506081

**Optional Filter Elements**
- DBB8866 Fuel Filter & DBB0248 Water Absorbing Filter
- DBB8877 Fuel Filter & DBB0248 Water Absorbing Filter
- DBB8866 Fuel Filter & DBB0248 Water Absorbing Filter
- DBB8877 Fuel Filter & DBB0248 Water Absorbing Filter

**Target ISO Cleanliness**
- 14/13/11 or better
- 18/16/13 or better

**Fluid Compatibility**
- All diesel fuels
- Hydraulic, gear, transmission and engine oils

**Micron Rating & Efficiency**
- <4 micron @ Beta 2000
- 25 micron @ Beta 2000
- 14 micron @ Beta 2000

**Water Absorbing Filter**
- For free and emulsified water (optional for P506037)
- n/a

**Power Consumption**
- 240 Volt 50 Hz with 2m cable
- 12V 35 Amp max
- 240 Volt 50 Hz with 2m cable

**Max. Flow Range**
- 63 lpm @ 2800 RPM
- 57 lpm @ 2900 RPM
- 40 lpm @ 1450 RPM
- 6 lpm @ 1450 RPM

**Pump**
- Vane pump
- Gear pump
- Gear pump

**Dimensions**
- H = 1830mm
- W = 550mm
- D = 700mm

**Weight**
- 65 Kgs
- 34 Kgs

**See page 13 for Parallel and Series Filtration Flow Paths**
Fuel and Lubricant Filters

Premium Donaldson Blue® Clean Solutions filters provide unsurpassed cleanliness in a single pass. They are suited to inlet and outlet filtration applications. Their spin-on design enables fast and simple filter changes without special tools and provides greater protection from contamination during service than traditional cartridge style filters.

Donaldson Blue bulk fluid filters incorporates our best technology and construction to handle all fuels and lubricants in all operating environments. Donaldson Electrostatic Reduction Technology (D.E.R.T.) prevents filter media damage from electrostatic discharge. Epoxy is used in filter construction for increased fluid compatibility. E-coating provides maximum corrosion resistance and epoxy adhesion. Viton® O-rings provide reliable sealing and maximum fluid compatibility.

**Features**

- Highly efficient, state-of-the-art filter media and design
- Unsurpassed filter efficiency
- Cleans to target ISO cleanliness in a single pass
- Modular design can be configured for virtually any flow rate or usage level
- Fast and easy to service

**Applications**

- Single pass filtration for clean fluid transfers
- High efficiency kidney looping
- Inlet and outlet filtration at bulk storage tanks
- Dispenser “polishing” filtration on fuel pumps and hose reels
- Mobile and stationary applications

**D.E.R.T.™ Donaldson Electrostatic Reduction Technology**

Electrostatic discharge can be created when diesel fuel or light oils pass through filter media at high flow rates. The fluid being filtered may have inadequate conductivity to dissipate the charge generated by high flow filtration applications. The electrical charge can build-up in the fluid until it discharges or sparks across the filter, burning holes in the filter media and letting through harmful contaminants. Donaldson’s proprietary Electrostatic Reduction Technology neutralizes electrical charge and prevents damage to the filter media. This enables efficient single pass fuel filtration in high flow applications.

**Specifications**

- **Filter media damage from Electrostatic Discharge (ESD)**
- **Electrostatic Reduction Technology (D.E.R.T.)™ prevents media damage during high flow fuel applications.**

**Application Chart**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Compact Fuel Filter</th>
<th>Compact Fuel Filter</th>
<th>Fuel Filter</th>
<th>Fuel Filter</th>
<th>Light Oil Filter</th>
<th>Fuel Filter</th>
<th>Compact Heavy Oil Filter</th>
<th>Heavy Oil Filter</th>
<th>Water Absorbing Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBB5333</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DBB7733</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBB8666</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBB8777</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBB8665</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBB2533</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBB8664</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBB2438</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td>121 lpm / 32 gpm</td>
<td>246 lpm / 65 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Select the proper filter by fluid type and OE recommended ISO code. Do not over-filter fluids. Doing so may result in the stripping of beneficial additives. Actual flow rate varies based on fluid viscosity, pumping pressure and filter loading.

**D.E.R.T.™** Donaldson Electrostatic Reduction Technology prevents media damage during high flow fuel applications.

See pressure drop/flow rate charts on page 18-19.
Filter Heads

Clean Solutions filter heads feature robust, aluminium construction with steel inserts to minimize metal-to-metal galling between the head and the filter, even when used with diesel fuel. The threaded insert contains an O-ring seal to completely seal the clean side of the filter from the dirty side for maximum single pass protection. Viton® seals are compatible with a wide range of fluids and maintain their integrity in cold weather.

For maximum cleanliness, use Clean Solutions filter heads with Donaldson Blue bulk fluid filters.

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

FEATURES

- Steel inserts are safe to use with diesel fuels
- Threads contain an O-ring to completely seal the clean side from the dirty side of the filter
- Heads are pre-ported for optional pressure gauges and service indicators

APPLICATIONS

- For use with Clean Solutions filters
- Compatible with all diesel fuels and lubricants

**Part Number**

<table>
<thead>
<tr>
<th></th>
<th>Single Filter Head</th>
<th>Single Filter Head</th>
<th>Dual Filter Head</th>
<th>Dual Filter Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number</td>
<td>P570329</td>
<td>P570330</td>
<td>P568583</td>
<td>P574958</td>
</tr>
<tr>
<td>Connection</td>
<td>SAE-20 O-ring</td>
<td>1¼” SAE 4-Bolt Code 61 Flange</td>
<td>1¼” SAE 4-Bolt Code 61 Flange</td>
<td></td>
</tr>
<tr>
<td>Filter Quantity*</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Max. Flow Range**</td>
<td>246 lpm / 65 gpm</td>
<td>473 lpm / 125 gpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid Compatibility</td>
<td>All diesel fuels and lubricants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Pressure</td>
<td>350 psi / 2413 kPa / 24.1 bar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Static Burst</td>
<td>800 psi / 5516 kPa / 55.2 bar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to 118 °C / -40 to 245 °F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator Port</td>
<td>Use to adapt pressure gauges or sampling ports (sold separately see page 26-27)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>Aluminium head with threaded steel inserts and Viton® seals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compatible Filters</td>
<td>DBB5333, DBB7733, DBB8666, DBB8777, DBB8665, DBB2533, DBB8664, DBB248</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Filters sold separately

**Actual flow rate varies based on fluid viscosity, pumping pressure and filter loading.
Clean Solutions Filter Manifolds expand capacity or increase flow rate beyond the capability of a single or dual filter head. Two or more manifolds can be plumbed together to accommodate even larger flow rates.

Manifolds split flow evenly between the individual filters. Fluid passes through only one of the filters on its way across the manifold. Dividing the flow between multiple filters plumbed in parallel reduces the pressure drop through each filter.

The combination of Clean Solutions manifolds and filters ensure that your equipment receives the cleanest possible fuel and oil.

**FEATURES**
- Fast, easy and safe to service
- Requires no electrical or air hook-ups
- Large capacity in small footprint
- Flexible mounting options (horizontal or vertical)
- Cost effective high capacity system

**APPLICATIONS**
- Bulk fuel and lubricant filtration and water removal
- High flow transfer into or out of tanks and dispensing equipment
- Hard-to-filter high viscosity oils
- Inline industrial filtration of gear oils and lubricants
- Kidney loop applications

**Manifolds**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Filter Quantity**</th>
<th>Mounting Connection</th>
<th>Max. Flow Range***</th>
<th>Shipping Weight</th>
<th>Pressure Gauges</th>
<th>Sampling</th>
<th>Fluid Compatibility</th>
<th>Working Pressure</th>
<th>Compatible Filters</th>
</tr>
</thead>
<tbody>
<tr>
<td>P561880</td>
<td>4</td>
<td>2&quot; ANSI 150 Flange</td>
<td>946 lpm / 250 gpm</td>
<td>64 kg / 140 lbs</td>
<td>2 pcs 0-160 psi / 0-11 bar gauges included</td>
<td>Includes upstream and downstream mini-mess sampling ports with M16 x 2 thread</td>
<td>All diesel fuels and lubricants</td>
<td>260 psi / 1792 kPa / 179 bar up to 30°C / 100°F</td>
<td>DBB5333, DBB7733, DBB8666, DBB8777, DBB8665, DBB2533, DBB8664, DBB0248</td>
</tr>
<tr>
<td>P568932</td>
<td>8</td>
<td>4&quot; ANSI 150 Flange</td>
<td>1893 lpm / 500 gpm</td>
<td>141 kg / 310 lbs</td>
<td>Accessories Sold Separately</td>
<td></td>
<td></td>
<td>145 psi / 1020 kPa / 16 bar</td>
<td></td>
</tr>
<tr>
<td>P568933</td>
<td>10</td>
<td></td>
<td>2271 lpm / 600 gpm</td>
<td>177 kg / 390 lbs</td>
<td></td>
<td></td>
<td></td>
<td>150 psi / 1034 kPa / 16.3 bar</td>
<td></td>
</tr>
<tr>
<td>1KDFF1008</td>
<td>Up to 8</td>
<td></td>
<td>1700 lpm / 450 gpm</td>
<td>46 kg / 102 lbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFF1012</td>
<td>Up to 12</td>
<td></td>
<td>2650 lpm / 700 gpm</td>
<td>58 kg / 128 lbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Operating Temperature**
-40 to 118 °C / -40 to 245 °F

**Actual flow rate varies based on fluid viscosity, pumping pressure and filter loading.

See system Sizing and Design on page 28-31 and pressure drop / flow rate curves on page 18-19.

See page 26 for Blanking Caps and Other Accessories.
Bulk hP Filters and Heads

Filtering oil prior to dispensing into equipment is critical to meet the ISO cleanliness specifications demanded by today’s OEM’s. Donaldson Bulk hP filters provide high efficiency filtration in a single pass.

Service shops use high pressure pumps to force oil through long lengths of piping and hose reels prior to dispensing into equipment. Donaldson Bulk hP filters remove contaminants delivered in oil and picked up in storage or delivery lines during final transfer. They ensure the required ISO cleanliness level is met every time.

### FEATURES
- Up to 1000 psi / 6894 kPa / 68.9 bar working pressure
- Extended life filters with high dirt holding capacity
- Easy disposal with recyclable can and incinerable element
- Compact design requires only 1/5 / 38 mm clearance for servicing

### APPLICATIONS
- Lube shops
- Mobile service trucks
- Other higher pressure single pass applications

### PARTS

#### Part Number
- P566023
- P566024

#### Working Pressure
1000 psi / 6894 kPa / 68.9 bar

#### Indicator
Yes

#### Bypass Valve
No / Yes - 50 psi / 345 kPa / 3.4 bar

#### Connections
SAE-16 O-ring

#### Part Number
- P565184
- P565185
- P565183

#### Target ISO Cleanliness
- 14/13/11
- 16/14/11
- 18/16/13

#### Fluid Compatibility
Petroleum based oils

#### Max. Flow Range
189 lpm / 50 gpm

#### Efficiency
- 4 micron @ Beta 2000
- 8 micron @ Beta 2000
- 14 micron @ Beta 2000

#### Working Pressure
1000 psi / 6894 kPa / 68.9 bar

#### Element Collapse Pressure
300 psi / 2068 kPa / 20.7 bar

#### Application
Hydraulic, gear, transmission and engine oils

#### Rated Static Burst
2200 psi / 15,186 kPa / 151.7 bar

### WARNING
THERMAL EXPANSION
Donaldson highly advises following the pump manufacturer’s relief recommendations. Pump manufacturers offer relief valves to protect against over pressurization. A mere 5.5 °C / 10 °F increase in oil temp can add 450 psi / 3103 kPa / 31 bar to the system while the pump is shut off.
T.R.A.P™ Breather Assemblies

The Thermally Reactive Advanced Protection (T.R.A.P™) Breather assembly protects the fluids in your storage tank from airborne particulate moisture contamination and ambient moisture. It combines a high capacity 3 micron air filter with a deliquescent breather and dries itself when air is expelled from the tank. This self-regenerating capability of T.R.A.P™ enables extended life and functionality. Keep your fluids clean and dry with a Donaldson T.R.A.P™ Breather.

Tanks sizes above 37,854 l / 10,000 gal may require multiple units and pressure vacuum relief valves. Contact Donaldson for assistance.

Assembly Part Number

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DFF0078</td>
<td>P696148</td>
<td>PS06113</td>
</tr>
<tr>
<td>PS06063</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Efficiency

97% efficient @ 3 micron

Max. Flow Range

For inlet or outlet flow up to 500 lpm maximum
For inlet or outlet flow up to 1,000 lpm

Overflow Check Valve

Opens at 2.32 psi / 15 kPa
3 psi / 20.7 kPa
N/A
N/A

Standard PV Settings

N/A
N/A
3.1” H2O Vacuum and 6.7” H2O Pressure
API2000

Compliance

N/A
N/A
API2000

Operating Temperature

-40 to 200 °F / -40 to 93 °C

Fluid Compatibility

Safe for use with all fuels and lubricants

Indicator

Standard mechanical
12450-400 Magnahelic gauge

Height

410 mm / 16”
520 mm / 23.5”
666 mm / 25.8”

Construction

ABS housing, Urethane end caps, brass
ABS housing, Urethane end caps, stainless steel
ABS, Urethane, Aluminium, Steel, Brass

Connection

1 1/2” BSP female
1 1/4” BSP female
2” BSPT socket

Replacement filter

P923075 x 1
P923075 x 2

FEATURES

• High efficiency air filtration
• Longer life and lower airflow restriction than typical silica gel breathers
• Self-regenerating moisture adsorption
• Easy to service

APPLICATIONS

• For use with all diesel fuels and lubricants
• Above and below ground tanks
• Mobile service trucks
• Indoor or outdoor applications
• Most tanks up to 37,854 litres / 10,000 gal
(large tanks may require multiple units)
The Donaldson Reservoir Air Dryer eliminates the need to continually replace conventional desiccant breathers, enhancing reservoir breathing systems by continuously purging and dehydrating reservoir headspace.

With no electrical requirements, the Donaldson Reservoir Air Dryer combats atmospheric ingestion of moisture by introducing a steady stream of clean, dry air to the reservoir. This constant airflow helps sustain optimal conditions and prevents the formation of condensation and rust in the reservoir, minimizing the potential for particulate and water ingestion through reservoir access points.

When combined with a T.R.A.P. Breather, the complete system keeps moisture and contamination out, even if fluid flow rate out of the tank surpasses the Reservoir Air Dryer flow rate into the tank.

**APPLICATIONS**
- Lubricant system reservoirs
- Diesel storage tanks
- Oil storage tanks
- Gear boxes
- Hydraulic system reservoirs

**FEATURES**
- The clean, dry air sweep dehydrates the reservoir head space and removes dissolved moisture from exposed oils and fuel
- Operates with standard plant air; instrument quality air is not required
- Submicron coalescing air filter collects oil and water and fine particles present in the air
- Automatic drain purges captured liquid with no intervention required
- Visual indicator monitors filter condition
- Membrane air dryer reduces plant air dew point by as much as 83°C / 150°F
- Pressure regulator depressurizes the air and ensures that the proper flow rate of air is introduced into the reservoir

**Assembly Part Number**
- P575852

**Efficiency**
- Reduces dew point as much as 150 °F (83 °C)

**Outlet Flow Volume @ 100 psi and dew point suppression**
- 0.5 scfm (14.2 slpm) maximum

**Inlet Air required @ 100 psi**
- 0.8 scfm (22.7 slpm) maximum

**Pre-Filter Condition**
- Visual Indicator (Green/Red)

**Pressure Regulator**
- Dial Gauge

**Coalescer Drain**
- Automatic Float Type

**Max Working Pressure**
- 116 psi (800 kPa / 8.00 bar)

**Max Operating Temperature**
- 125°F (52°C)

**Fluid Compatibility**
- Petroleum and Phosphate Ester Fluids, Diesel Fuels*

**Inlet/Outlet Connection**
- ¼” NPT

**Mounting Bracket**
- 3/8” - 16 UN Threaded Nut

**Weight**
- <5 lbs (<3 kgs)

**Replacement**
- Coalescing Pre-Filter

*The Reservoir Air Dryer is not recommended for use on gasoline holding tanks or for the head space of any flammable liquid (Flash Point of 100F/38C)
Clean DEF Filter

Today’s Selective Catalytic Reduction (SCR) emissions control systems require clean Diesel Exhaust Fluid (DEF) for precise dosing and complete atomization to occur. However, contamination from transfer and storage or corrosion from incompatible materials can prevent your SCR system from getting the clean DEF it needs for proper operation.

The Donaldson DEF filter catches contaminants before they reach your vehicle or equipment and the onboard DEF filter. Clean DEF ensures proper function of the SCR and extends the life of the onboard DEF filter.

FEATURES
- 1 micron at beta 5000 efficiency
- 316 stainless steel housing
- Precise knife edge internal seal
- Heavy duty construction
- Maximum working pressure of 300 psi
- Leak-free O-ring seal
- Integrated gauge/sample ports
- Replacement filters available individually

APPLICATIONS
- DEF dispensers up to 38 lpm / 10 GPM

DEF必须是清洁的，以便精确地供应和将NOx从排气转化为无害的氮和水蒸气。

PM Reduction
NOx Reduction
DEF Dosing Module
DPF
SCR
Pre-Filter

DEF IS HIGHLY CORROSIVE. All pipe fittings must be compatible with DEF. Most plastics as well as stainless steel are acceptable. Carbon steel, zinc, aluminium, brass, copper, etc. are not recommended due to undesirable chemical reactions. If any of these materials are used in your system they should be immediately replaced with a compatible material.

DEF Filter Housing
- P575058 DEF Filter Housing 1" BSPT
- P575059 Clean DEF Filter
- P575060 DEF Housing Replacement O-ring

MOUNTING BRACKET
- Stainless steel pressure gauge not included — must be sourced separately.

DEF Filter Pressure Drop

<table>
<thead>
<tr>
<th>Flow Rate (LPM)</th>
<th>Pressure Drop (BAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.2</td>
</tr>
<tr>
<td>10</td>
<td>0.3</td>
</tr>
<tr>
<td>15</td>
<td>0.4</td>
</tr>
<tr>
<td>20</td>
<td>0.5</td>
</tr>
<tr>
<td>25</td>
<td>0.6</td>
</tr>
<tr>
<td>30</td>
<td>0.7</td>
</tr>
<tr>
<td>35</td>
<td>0.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow Rate (GPM)</th>
<th>Pressure Drop (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.2</td>
</tr>
<tr>
<td>10</td>
<td>0.3</td>
</tr>
<tr>
<td>15</td>
<td>0.4</td>
</tr>
<tr>
<td>20</td>
<td>0.5</td>
</tr>
<tr>
<td>25</td>
<td>0.6</td>
</tr>
<tr>
<td>30</td>
<td>0.7</td>
</tr>
<tr>
<td>35</td>
<td>0.8</td>
</tr>
</tbody>
</table>

CAUTION
- Stainless steel pressure gauge not included — must be sourced separately.
### Accessories

#### PARTS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFF1005</td>
<td>I-8, I-12 Blanking Cap</td>
<td>Blank off up to 6 orifices on I-12 manifold for flush mounting</td>
</tr>
<tr>
<td>P506070</td>
<td>Commissioning Cap</td>
<td>Allow unfiltered flow through manifolds during site commissioning</td>
</tr>
<tr>
<td>P506071</td>
<td>4-Bolt Code 61 Flange to 1½&quot; BSPP Adapter</td>
<td>¼&quot; BSPP, 1/4&quot; NPT ports (plugged)</td>
</tr>
<tr>
<td>P506101</td>
<td>4-Bolt Code 61 Flange to 1½” BSPP Flange Connection Kit</td>
<td>Use with 1 x P560071 Flange to connect two dual heads in series</td>
</tr>
<tr>
<td>P573642</td>
<td>Threaded Pipe Nipple</td>
<td>1/2&quot; NPT, for connecting two P703030 single heads in series</td>
</tr>
<tr>
<td>P506076</td>
<td>SAE 20 O-ring to 1” BSPT Male</td>
<td>Adapts P570329 Single filter head to 1” BSPT male</td>
</tr>
<tr>
<td>P506112</td>
<td>Pressure &amp; Vacuum Valve 2”</td>
<td>Use with 1 x P923075 T.R.A.P. Breather or P506113 Single T.R.A.P. Breather Assembly</td>
</tr>
<tr>
<td>P506091</td>
<td>Pressure &amp; Vacuum Valve 3”</td>
<td>Use with 2 x P923075 T.R.A.P. Breathers P506093 Dual T.R.A.P. Breather Assembly</td>
</tr>
<tr>
<td>P573414</td>
<td>Upstream Sampling/Indicator Port Adapter</td>
<td>For single, dual heads, and HP heads, SAE-4, use with P563224 for sampling</td>
</tr>
<tr>
<td>P573415</td>
<td>Downstream Sampling/Indicator Port Adapter</td>
<td>For single, dual heads, and HP heads, SAE-4, use with P563224 for sampling</td>
</tr>
<tr>
<td>P563224</td>
<td>Test Point</td>
<td>For use with P573414 and P573415 adapters SAE-4 to M16 x 2</td>
</tr>
<tr>
<td>P563212</td>
<td>Test Point</td>
<td>For all Clean Solutions manifolds, ½&quot; NPT to M16 x 2</td>
</tr>
<tr>
<td>P563215</td>
<td>Test Point</td>
<td>For dual heads, ¼ BSPP to M16 x 2, use with P506071 flange, P506037 B.O.S.S. and P506057 Bu.F.S.S.</td>
</tr>
<tr>
<td>P563205</td>
<td>Test Point Hose Assembly, 1220mm</td>
<td>1620 series M16 x 2 thread, for use with P563212, P563215 and P563224 mini mess test points</td>
</tr>
</tbody>
</table>

#### PRESSURE GAUGES AND SERVICE INDICATORS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>P174396</td>
<td>Electrical Service Indicator 50 psi / 345 kPa / 3.45 bar</td>
<td>Use with all Clean Solutions heads and manifolds, microprocessor compatible</td>
</tr>
<tr>
<td>P574177</td>
<td>Visual Service Indicator 50 psi / 345 kPa / 3.45 bar</td>
<td>For single and HP heads, industrial grade green to red</td>
</tr>
<tr>
<td>P165965</td>
<td>Visual Service Indicator 25 psi / 172 kPa / 1.72 bar</td>
<td>For single and HP heads, industrial grade green to red</td>
</tr>
<tr>
<td>X220074</td>
<td>Remote Mount Visual Indicator Kit</td>
<td>For use with DFF0078 T.R.A.P. Breather Assemblies</td>
</tr>
<tr>
<td>X220097</td>
<td>Remote Mount Visual Indicator</td>
<td>For use with P506148 T.R.A.P Breather Assemblies</td>
</tr>
<tr>
<td>P639453</td>
<td>Visual Service Indicator Connector</td>
<td>M10 x 1.5 - 15.5 mm ID</td>
</tr>
</tbody>
</table>

#### SAMPLING TOOLS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>P567869</td>
<td>0.8 Micron Membrane Filter</td>
<td>Spares for Patch Test Kit, purchase in multiples of 100</td>
</tr>
<tr>
<td>P567860</td>
<td>Solvent Dispensing Filter</td>
<td>Spares for Patch Test Kit, purchase in multiples of 1</td>
</tr>
<tr>
<td>P567805</td>
<td>Analysis Cards</td>
<td>Spares for Patch Test Kit, purchase in multiples of 50</td>
</tr>
<tr>
<td>P567818</td>
<td>120 ml Sample Bottle</td>
<td>Spare for Patch Test Kit</td>
</tr>
</tbody>
</table>

#### TEST KIT

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>X009329</td>
<td>Patch Test Kit</td>
<td>Test kit for measuring fluid cleanliness</td>
</tr>
<tr>
<td>P567818</td>
<td>0.8 Micron Membrane Filter</td>
<td>Spares for Patch Test Kit, purchase in multiples of 100</td>
</tr>
<tr>
<td>P567860</td>
<td>Solvent Dispensing Filter</td>
<td>Spares for Patch Test Kit, purchase in multiples of 1</td>
</tr>
<tr>
<td>P567805</td>
<td>Analysis Cards</td>
<td>Spares for Patch Test Kit, purchase in multiples of 50</td>
</tr>
<tr>
<td>P567818</td>
<td>120 ml Sample Bottle</td>
<td>Spare for Patch Test Kit</td>
</tr>
</tbody>
</table>
Bulk filtration systems must be designed properly to meet the desired ISO cleanliness code while maintaining the existing flow rates. The filter type and quantity of filters varies based on the desired cleanliness, system pressure and flow rate.

Increasing the flow rate will increase the pressure drop across a filter. If the pressure drop is too high, system flow rate can be reduced or damage to the filter can occur. To reduce the pressure drop, increase the number of filters in the system.

The chart below demonstrates the pressure drop experienced by a filter with various viscosities and flow rates. The steeper the pressure drop curve, the more filters that must be added to the system.

Additional filters plumbed in parallel will decrease the flow rate per filter, lowering the pressure drop and allowing existing flow rates to be maintained.

**The Importance of Temperature in Sizing Your Filtration System**

Fluid viscosity, measured in centistokes (cSt) or Saybolt Seconds Universal (SSU or SUS), is the resistance of a fluid to flow (thickness of fluid). Low viscosity fluids pass through filters with less resistance than high viscosity fluids. Higher fluid viscosities have higher pressure drops due to greater resistance passing through the media.

The colder the fluid, the higher the viscosity, so the lowest potential temperature of the fluid during filtration is the best measure for sizing a bulk filtration system. Due to the high specific heat capacity of fluids, the lowest ambient temperature may not be an accurate reflection of the actual fluid temperature. Avoid oversizing your system by using the stored fluid temperature and not the lowest ambient temperature, which tends to be lower than the temperature of the fluid in storage or transport.

**FUEL/OIL KINEMATIC VISCOSITY COMBINED WITH TEMPERATURE IN CENTISTOKES CST**

<table>
<thead>
<tr>
<th>SAE Gear Oil</th>
<th>75W</th>
<th>80W</th>
<th>85W</th>
<th>90</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE Engine Oil</td>
<td>5W</td>
<td>10W</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>ISO Grade</td>
<td>15</td>
<td>22</td>
<td>32</td>
<td>48</td>
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<tr>
<td>°F</td>
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<td>248</td>
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<td>7</td>
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<td>176</td>
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<td>7</td>
<td>9</td>
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<td>9</td>
<td>105</td>
<td>375</td>
<td>820</td>
</tr>
<tr>
<td>-4</td>
<td>-20</td>
<td>15</td>
<td>480</td>
<td>880</td>
<td>2,350</td>
</tr>
</tbody>
</table>

Temperature greatly impacts fluid viscosity. Consider that ISO 32 oil at 40 °C / 104 °F has the same viscosity as diesel fuel (similar to water). When temperatures drop to -20 °C / -4 °F, the viscosity of that ISO 32 oil increases dramatically to over 2,000 centistokes, which is similar to honey at room temperature.
System and Sizing

Steps to Sizing a Bulk Application

1. Define product flow rate, fluid type and pressure drop restriction. New systems should ideally have less than 10 psi / 0.69 bar pressure drop for fuel and 15 psi / 1 bar pressure drop for lubricants.

INFORMATION GATHERING

- **FLOW RATE:**
- **FLUID TYPE:**
- **PRESSURE DROP:**
- **TEMPERATURE:**

2. Use the table on the page 29 to determine fluid viscosity using the fluid type and temperature.

3. Select the appropriate filter based on desired ISO cleanliness code and working pressure (see pages 10 and 11).

4. Determine the filter pressure drop using the flow rate and the fluid viscosity according to the appropriate chart on pages 18 – 19. Add the manifold pressure drop using the flow rate on page 15 to calculate total pressure drop.

You Don’t Need To Do It Alone.

Let a Donaldson specialist assist you by providing recommendations on sizing, selection and positioning of Donaldson filters. You can help us design your system by providing:

- Responses to steps 1-4 above.
- A schematic of your fluid transfer process (hand sketches work great), and/or
- Photographs of your site (tanks, inlets and outlets).

Just call 1800 FILTER (345 837) to get started.

CALCULATED PRESSURE DROP

\[ \text{DESIRED PRESSURE DROP} = \]
Global Presence with a Local Touch

At Donaldson, we’ve built a strong, flexible and responsive distribution network to serve our customers around the world.

**Localized Manufacturing** – It starts with 30+ manufacturing locations around the world – producing most filters in the regions where they’re used.

**Primary Distribution Centers** – Filters then move to our regional warehouses and distribution center hubs – meaning the filters you need are never far away.

**Logistics** – We work with a network of transportation and logistics companies, consolidators and cross-docking facilities to deliver products to distribution partners quickly and efficiently.

**Distribution Partners** – We’ve built one of the largest, strongest and most responsive distributor networks in the filter industry – meaning you can find the filters and support you need, nearly anywhere in the world.