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## Diesel Engine Lube Filtration

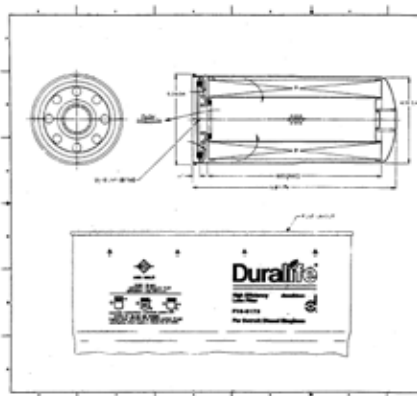
Much of the developed world's infrastructure can be attributed to the application of the diesel engine. The evolution of the diesel engine has been significant since first patented by Rudolph Diesel in 1892. However, the working principle remains a constant. Much the same can be said of the lube or oil system within the modern diesel engine. The lube system functions as the central circulatory system to these powerhouses in order to keep them running at top performance. While the internal demands continue to evolve, the basic principles remain the same.



Today's diesel engines are tasked with running more efficiently, while leaving a smaller impact on the environment.

These demands continue to drive significant changes to engines and the supporting components. Lube filtration engineers continue to introduce technology to keep these lube systems functioning at peak performance while helping improve the environment through longer oil drain intervals and the introduction of green materials.

Donaldson introduced three extended life lube filters in the early 1980s for three popular U.S. engine makes: Detroit Diesel, Cat, and Cummins. Extended service in 1984 was primarily focused on a more robust filter that would last through an extended mileage interval.



Engineering drawing of our first high efficiency, long life lube spin-on

Emission control technologies such as exhaust gas recirculation (EGR), diesel particulate filtration (DPF), and the introduction of closed crankcase ventilation (CCV) have a direct impact on the lube system. Today's oil handles more contamination for extended periods of time. A well designed lube filtration system is engineered up front with overall engine strategy in mind to provide maximum protection for the life of the engine. The benefits of this up front design have resulted in enhanced filtration medias and inclusion of traditionally separate components into a streamlined system.

Understanding end user needs is a commitment Donaldson takes seriously. It is with this in mind that we strive to offer design flexibility to meet field application needs. Longer life media, extended oil drain products, and traditional product offerings are combined to provide a solution for every unique diesel engine application.

### Diesel Lube Oil Trends & Changes

#### Changes in Lube Oil Systems

- Increased EGR rates, soot & acid
- Crankcase ventilation – less oil consumption, thereby less make up oil added and oil has to work harder
- Improved cleanliness for tighter component clearances
- Typical contaminants
- Design strategies (bypass over-pressure valves, cold flow)

#### Changes in end user oils

- CJ-4 vs. CI-4 Plus
- Increased levels of fuel dilution due to alternate fuels
- New contaminants due to alternate fuels
- Low SAPS oil compatible with emissions aftertreatment systems

#### Filtration requirements evolving as a result

- Trend towards "green" cartridge filter
- System approach, integration of components such as oil coolers
- Enhanced protection while maintaining service intervals (bypass or secondary filters, extending service intervals & durable medias)



## Full-Flow, By-pass or Two-Stage Filtration

The difference between the various lube filter configurations can be confusing. There are three common filtration approaches.

### Full Flow Filtration

Full flow filters receive near 100% of the regulated flow in an engine lube system. Full flow filters provide essential engine protection for maximum cold flow performance and filter life. Most lube filters available today are full flow.

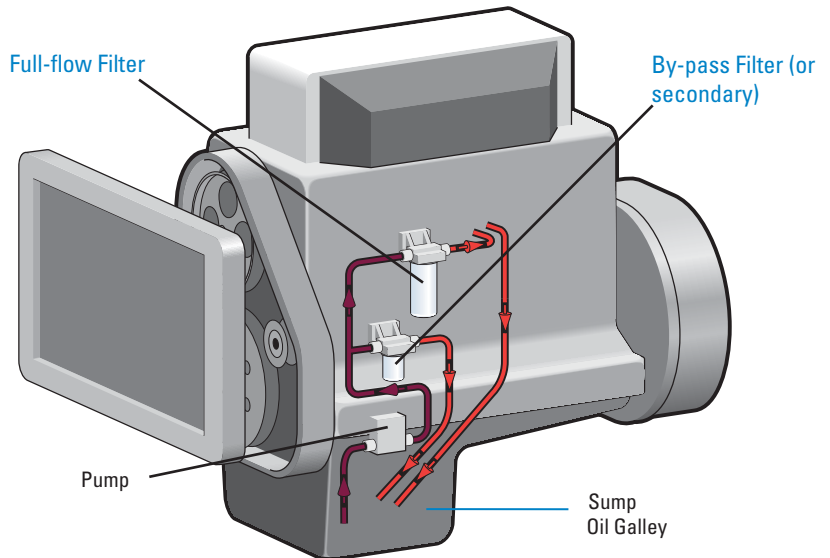
### By-pass (Secondary) Filtration

By-pass filtration is when a small portion of the system's oil flow (usually 5-10%) is diverted back to the sump or oil pan before reaching the primary filter. A by-pass filter captures smaller particles than the full-flow filter. Because of the increased efficiency of a bypass filter, they are more restrictive. To optimize restriction, a bypass filter should be located in a separate flow path, as illustrated on the right.

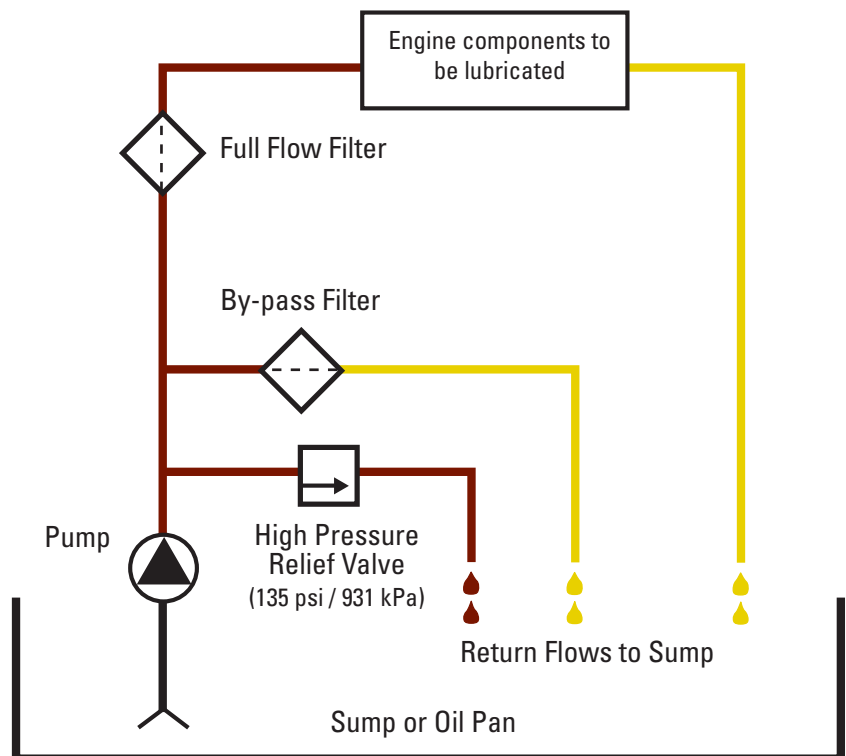
### Two-stage Filtration

A two-stage filter design attempts to combine the features of both a full flow and by-pass filter. The two-in-one design significantly increases restriction, causing shorter filter life and decreased cold flow performance. Poor cold flow performance starves the engine of oil during start up, leaving the engine temporarily unprotected. This may lead to increased engine wear that could result in premature repairs or even engine replacement.

Typical Engine Lube Filtration System



Typical Lube Circuit





### Filter Media

At Donaldson, we have a variety of lube filter medias available to meet the most stringent of engine lube system design requirements. Donaldson engineers have a history of developing media technology that exceeds application cleanliness and service life expectations. In fact, Donaldson was the first company to introduce fully synthetic media to the engine lube market in the early 1980s. This media is now commonly adopted for extended life or enhanced engine protection needs.

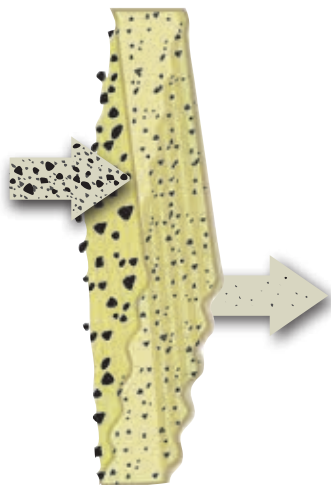
New lube media types are constantly under evaluation in our internal laboratories and in controlled field testing. If you have a specific application requirement, please contact Donaldson to see if there are additional media option to better suit your application.

#### Cellulose (traditional media)

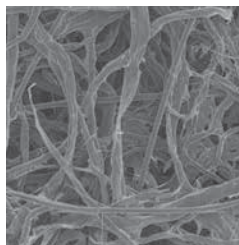
Engine lube filter media is most commonly a pleated cellulose base material. This media effectively combines an application's efficiency and capacity requirements while maintaining cost effectiveness.

As oil flows through media, large contaminants are captured on the surface of the filter while smaller contaminant becomes embedded in the underlying media layer. Industry filtration performance standards (ISO 16889) are used to determine a performance rating. The combination of the size of the particles and number of particles that pass completely through the media are measured as a "beta ratio" function. The filtration performance characteristics of a lube system are typically specified by the engine manufacturer.

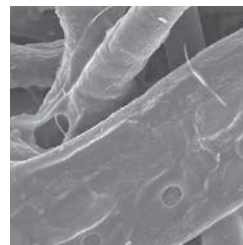
#### How it Works



#### SEM 100x



#### SEM 600x



#### Media Image

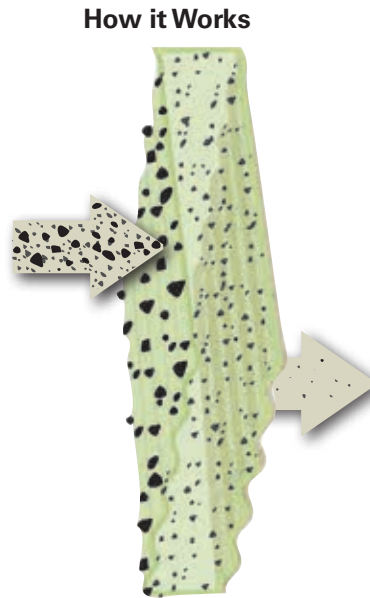




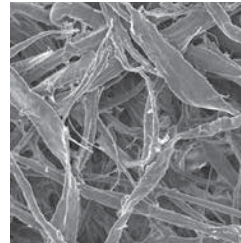
**Synthetic Blend (cellulose & synthetic media)**

This media is a blend of cellulose and synthetic media technologies. It utilizes the best attributes of both media fiber types to achieve an improved cost to performance ratio for more demanding applications than a cellulose only media can achieve.

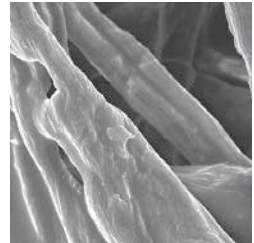
This media provides the consistency of layered fibers to capture coarse contaminant coupled with the affordability of cellulose to deliver an efficient and effective performance alternative to traditional cellulose media.



**SEM 100x**



**SEM 600x**

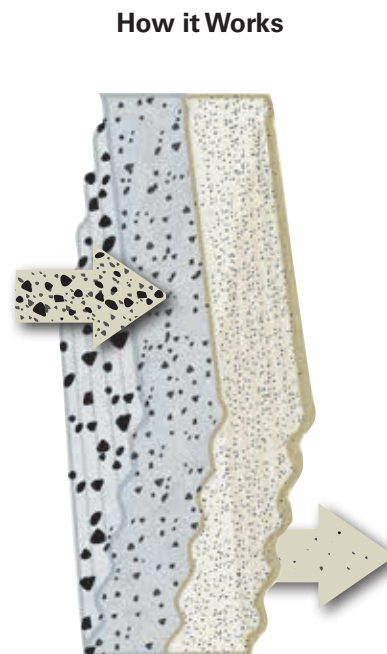


**Media Image**

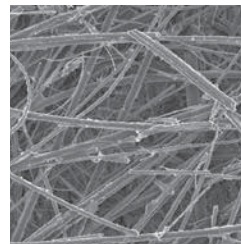


**Synteq™ Media (full synthetic media)**

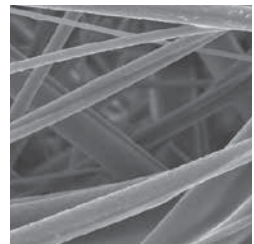
This engine lube filter media is constructed of layered, micro-fiberglass synthetic fibers and is trademarked Synteq™. It provides enhanced durability for extended drain intervals while maintaining or improving efficiency and capacity. Donaldson Synteq lube media also offers lower restriction. Low restriction allows better flow which ensures component protection over a larger range of engine conditions.



**SEM 100x**



**SEM 600x**



**Media Image**





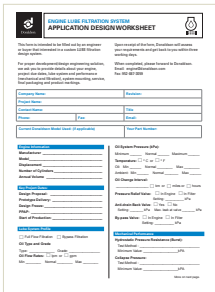
## Lube System Profile

At the end of this publication is a “tear-out” profile form for you to use to convey your system needs to Donaldson engineers.

The system profile has a list of all the design considerations required for proper engineering review to determine which Donaldson lube system would be the optimum solution.

- Lube system characteristics - oil flow rate, oil pressure, and temperature
- Filter change interval
- System functions - including pressure regulators, by-pass valve settings and anti-drain back
- Mechanical performance requirements - pressure, fatigue and vibration
- Filtration performance and test conditions
- Fitting and servicing considerations

As with most manufacturers, custom solutions require minimum annual production volumes and design and development phases. See page 143 for our lube filtration system design worksheet.



## What’s Right For Your Engine?

As you develop the future design of your engine or application, it is important to consider the filtration system needs. Depending on your objectives, it may be beneficial to choose from a catalog offering or partner with Donaldson for a filtration solution tailored to your application.

### Reasons to Select a Standard System

- Low budget for engineering collaboration, development time or cost or component tooling
- Prefer to have parts readily available – want to avoid manufacturing lead times (8-12 weeks) and not interested in warehousing service parts
- Have a need mix and match head assemblies with various filter performance choices
- End users would prefer an established brand for filtration

### Reasons to Consider a Custom System

- Engine design team is integrating new components that require a higher degree of filtration
- Looking for a system that does more; may include sensors, pumps, and/or heaters
- Have budget for engineering collaboration, development time/cost
- Interest in component / supplier consolidation – solutions that bridge a wide range of engine/vehicles
- Offering a unique solution with ease of maintenance

## Common Liquid Filtration Terms

**Spin-On:** Filter encased in a metal housing for easier service

**Cartridge:** These fit into a filter housing which is spun on into a filter head

**Cellulose Media:** Media from wood fibers

**Synthetic Media:** This media is comprised of man made fibers and typically results in a lower pressure drop than cellulose media.

**Housing:** The place in which the cartridge filter fits into

**Micron (µm):** The measurement of minute particles of dirt

**Pressure Drop:** The pressure difference between the upstream and downstream flow

**Pressure Regulating Valve:** regulates the pressure depending on the liquid force detected at the end of the receiving piston

**Sump or Oil Pan:** crankcase or oil reservoir of an internal-combustion engine

**Full Flow Lube Filter:** filters the oil passing through the engine before it reaches the bearings

**Bypass Lube Filter:** removes smaller particulates than would be removed by an engine’s normal filter, so that the need for additional oil or oil changes can be reduced

**Baffle Plate or Thread Plate:** mounted in the housing below the bearing will help retain the grease where it is needed



## Extended Service Oil and Filters

Donaldson introduced three extended life lube filters in the early 1980s for three popular U.S. engine makes: Detroit Diesel, Cat and Cummins. Extended service in 1983 was primarily focused on a more robust filter that would last through an extended mileage interval.

Today, extended service filters are expected to last to the next oil change - in some cases this is double or triple traditional spin-on lube filters. Another major appeal with extended service filters is the “green” aspect – the use and disposition of fewer filters.

### Extended Service Oil Drains

The key to any oil drain extension program is doing it safely to ensure not to create any harmful effects. The proper way to implement the change that is through oil analysis. Oil analysis measures critical oil parameters to ensure that the oil quality and is critical to establishing an extended drain.



*Oil Analysis Kit X007374*

### Oil Considerations & Extended Drain Filters

Today’s mineral based oils are completely adequate for most heavy duty driving conditions and user needs. The formulations have evolved to the point that the serious problems of the past (such as viscosity breakdown) are no longer of concern for most applications. Additionally, the ability to readily combine with today’s additive packages and significantly lower price has helped mineral based oils remain the clear favorite.

Synthetic oils can perform better than mineral oils in extreme temperatures, both hot and cold. At sub-freezing temperatures, flow properties of synthetics are better. This means faster starts, and faster oil delivery through the engine. The benefit is better lubrication on start up and less work for your starting system. Synthetics are usually SAE 5W-40 / ISO VG 22-150 viscosity grade (mineral oils typically being SAE 15W-40/ISO VG 46-150) and allow a little better fuel economy (1-3%). However, driving habits have the most influence on fuel economy.

At high temperatures, synthetics are more oxidation resistant and less volatile than mineral oils. Less volatility can be a benefit, because less oil will be lost by evaporation, and may reduce the to top-off oil as frequently. High temperature oxidation resistance isn’t always a benefit.

Many older diesel engines don’t get hot enough to really challenge mineral oils that contain antioxidants. With more sophisticated emission control systems, engines may run hot enough to favor synthetic oil.

While there are clear benefits to synthetic oil, at least two drawbacks have hindered their wide spread adoption. The first issue is that synthetic oil has poor solubility for additives; making it harder to control for soot and Total Base Number (TBN) retention. All the while the base stock synthetic oil may remain useful, soot levels may exceed OEM guidelines or the oil may become too acidic. Secondly the price for synthetic oils is typically 3 – 4 times the cost of a comparable mineral oil. Combine the cost with the unlikely prospect of tripling an oil drain and synthetic oil becomes cost prohibitive.

### Extended Service Filters

Donaldson Blue™ filters are for those who want to maintain oil health over the new drain interval and need a filter that can last as long as the oil.

Our Donaldson Blue lube filters use Synteq™ media. Synteq is more effective than standard cellulose filter media at removing small contaminants, it improves lubricant flow and offers increased dirt holding capacity for the extended service.

Donaldson Blue filters are direct replacements to standard filters – no system modifications and no special disposal requirements.



## Donaldson Blue™ Lube Filters Help You Go the Extra Mile Delivering Extended Service Intervals



Donaldson Blue™ lube filters are designed for heavy-duty truck and diesel engine extended maintenance programs. Just a simple cross reference of your current lube filter and you'll reduce oil consumption, increase engine protection and reduce operating costs.

For most lube filters, the secret to balancing efficiency, capacity and restriction is hidden underneath the surface. Donaldson Synteq™ media technology provides the optimal balance of all three characteristics. Donaldson Blue filters are the definitive choice to protect equipment, reduce maintenance cost and increase equipment uptime.



**Donaldson Blue™** lube filters with Synteq™ media reduce oil consumption, increase engine protection and reduce operating costs. They provide the optimal balance of efficiency, capacity and restriction, and remove more than **90% of contaminants** that are 10 microns or larger, compared to 50% or less for typical cellulose filters. At the same time, they deliver **nearly double** the contaminant carrying capacity of standard cellulose filters. Fully synthetic Synteq media also delivers **lower restriction** to provide **maximum oil flow**. Donaldson Blue lube filters are designed specifically to provide **longer filter life** – a critical component of any extended filter maintenance program.





### Upgrade from a Competitive Filter to Donaldson Blue™

Donaldson Blue filters are direct replacements to standard filters – no system modifications or special disposal requirements.

Donaldson Blue™	Donaldson Standard	Fleetguard	Baldwin	Luber-finer	Wix	Primary Application
<b>DBL3998</b>	P552100	LF9620	B495MPG	LFP2160XL	51971XD	Detroit Diesel Series 60 Engines
<b>DBL7300</b>	P553000	LF9039	BD7309	LFP3000XL	51748XD	Cummins® Engines
<b>DBL7345</b>	P558616	LF3805	—	—	—	Cummins® 4B 3.9 Series Lube
<b>DBL7349</b>	P558615	LF9028	BT7349	LFP780XL	57620XE	Cummins® 4B and 6.B Series Lube
<b>DBL7367</b>	P550367	LF9026	—	LFP2285XL	—	Navistar Engines
<b>DBL7405</b>	P554005	LF9691	B7249MPG	LFP4005XL	51792XD	Caterpillar Engines
<b>DBL7483</b>	P553191 / P550519	LF9667	—	LFP3191XL	—	Mack/Volvo Engines
<b>DBL7670</b>	P551670	LF9325	B96MPG	LFP670XL	51970XD	Cummins® Engines/ Detroit Diesel Engines
<b>DBL7690</b>	P550769	LF16046	—	—	57213	Mercedes Engines
<b>DBL7739</b>	P554004	LF3379	B76MPG	LFP3191	51791XE	Caterpillar Equipment
<b>DBL7900</b>	P559000	LF9031	—	—	57746XD	Cummins® ISK Engines and ISM Engines
<b>DBL7947</b>	P550947	LF3363SC	—	—	—	Detroit Diesel Engines



## Extended Oil Drain Intervals

Extended Oil Drain Intervals Oil service intervals are pre-determined by engine manufacturers (OEM's) and are designed to provide maximum engine protection under a wide variety of conditions. While a majority of equipment owners follow these guidelines there is a growing trend to extend oil service intervals beyond the OEM recommendations. However, Extended Oil Drain Intervals (EODI) are not for every application. To fully understand the risks involved you must look at the key factors affecting EODI's.

Engine lubricating oil is often referred to as the life blood of the engine. This analogy is not made simply because the oil circulates through the engine but more importantly because the oil performs critical functions necessary to maintain engine performance and maximize useful service life. There are two basic types of oil available today: mineral and synthetic. While these oils are completely different in composition, they must still meet the American Petroleum Institutes (API) qualification criteria recommended by the engine manufacturers. There are many suppliers of oil in the market today and not all meet the stringent requirements of the API standard. Insuring your oil meets these requirements and understanding the factors affecting the engine oil is the first step before extending your oil service interval.

Equipment operating extremes of heat, cold, idle time, airborne contaminants, and engine load adversely affect engine oil. Excessive Heat will break down engine oil and create deposits in the engine adversely affecting engine life. Severe cold will limit the ability of the engine oil to lubricate at start-up and may add unwanted moisture and unburned fuel to the oil. Extended Idle Time can result in increased amounts of unburned fuel entering the oil resulting in oil dilution and inadequate lubrication. Extreme dust conditions may tax even the best air filtration system adding fine contaminants to the oil overloading the additive package that keeps them in suspension. Heavy loads on the engine can produce extra heat putting a greater demand on the cooling system and increasing the importance of cooling system maintenance during EODI's. Off-road operation will likely see more of these extremes than on-highway operation.

Engine designs today are cleaner burning with reduced emissions and make excellent candidates for extended oil drain intervals. However, most customers cannot afford to buy new equipment every year and normally fleets have a mixture of equipment varying in vintage and service life. As piston rings and valve guides wear in the engine, combustion by-products increase. These combustion by-products end up accelerating oil additive depletion and can create harmful deposits on internal engine surfaces making the engine less likely to benefit from an EODI.

Oil filters remove contaminants from the oil before they generate wear on engine component surfaces. There are many filtration products offered in the industry today with some claiming to allow for extended oil drain intervals. The fact is, the filter alone will not extend the life of engine oil. The filter has one function, and that is to filter contaminants from the oil. While most filters today do an excellent job in filtering, the trend of extending oil drain intervals 2 to 3 times the normal service interval has pushed the materials used in the manufacture of filters to the limit. Adhesives, rubber compounds, filter media, and even the steel construction in spin-on filters needs to be designed to meet the extended period of time they are expected to be in service. Before considering an EODI make sure the filter manufacturer will warranty their product when used in this manner.

If after considering all the factors affecting extended oil drain intervals you feel your equipment is a candidate for EODI's you will need to develop a test program to determine what length EODI is right for your equipment. To determine the correct length EODI you must first implement an oil analysis program to develop history on each piece of equipment scheduled for extended oil service. This will allow you to determine if there is any usable life left in the oil. The primary indicators will be silicon (dirt), viscosity (oil film strength), soot (combustion by-product), and total base number (TBN). Most engine manufacturers have oil analysis guidelines.



Typically you will want to keep your silicon within 15ppm of the initial oil sample, your viscosity within the original oil grade specifications, soot below 3%, and the TBN number above 3. Each piece of equipment will vary and the key is to look for trends in the analysis. If oil analysis indicates you can extend your service interval you then need to move out in steps. Oil analysis should continue at the normal service interval and in increments of 20% thereafter until the analysis shows the useful life of the oil deteriorating. Once the maximum limit on the oil is reached the change interval should be set at the mileage of the previous sampling prior to indications of oil deterioration. Example: Normal service interval = 16,000 miles (25,000 km). Oil analysis performed at 16,000 (25,000 km), 19,200 (30,000 km), 22,400 (35,000 km), 25,600 (40,000 km), and 28,800 (45,000 km). If oil analysis indicates problems at 28,800 (45,000 km) the change interval should be backed off to 25,600 miles (40,000 km). This will allow for variables in operation and environment.

Extended oil drain intervals are not without risk and short term cost savings benefits should be balanced equally with engine performance and reliability. With all of the factors affecting the engine oil it is easy to see why OEM's have traditionally been conservative in setting oil drain intervals. If you think your equipment is a candidate for EODI program, do some research. Check with your filter, engine, and oil manufacturer for guidance. If you're not doing oil analysis, start a program. Review your filtration package and most of all understand the potential risks involved. If not properly implemented EODI short term savings are offset by expensive repairs and downtime further down the road. Always dispose of used engine oil and filters properly.

*Re-printed with permission of the Filters Manufacturer's Council : Technical Service Bulletin 98-1*

## Oil Analysis

Donaldson uses independent laboratories for oil analysis services and these labs are typically different from region to region. Each provides fast and accurate information about the status of your equipment. We only select labs and programs have have proven laboratory techniques and covers a wide range of systems and applications. Typical oil analysis service includes evaluating the results of the tests we perform and providing detailed reports, including specific maintenance recommendations.

Vehicle owners use the data and recommendations to improve preventive maintenance, reduce equipment downtime, and reduce overall cost of lubricants by extending oil drain intervals.



### Typical Oil Sampling Steps

- Collect the oil sample with sampling device
- Complete a lab processing form
- Labeling the sample with vehicle id, hours, miles, etc.
- Send the sample to lab
- Lab returns results - via mail or on-line.

### Recommended Sampling Intervals

#### On-Road Engines

Diesel	10,000 miles / oil change
Gasoline	3,000 miles / oil change
LPG	3,000 miles / oil change
Non-Engines	20,000 miles / 500 hours

#### Off-Road Engines

Diesel	250 hours / oil change
Gasoline	150 hours / oil change
LPG	150 hours / oil change
Non-Engines	500 hours / monthly

## Oil Analysis Kit for Fleets and Off-Road Vehicles and Equipment

Use X007374 for routine oil analysis for diesel engines or hydraulic oil reports on wear metals and additives.



### Kit Part No. X007374

Metals, ppm by wt	◆
Viscosity, cSt.	◆
Water %	◆
Fuel % by Infrared	◆
Soot by Infrared	◆
Glycol (Coolant)	◆

### Sampling Accessories

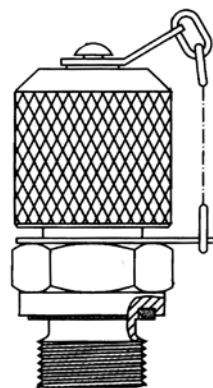
These accessories can simplify your oil analysis during the normal maintenance routines.

#### Plastic Tubing Part No. P176433

#### Sampling Pump Part No P176431



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



Quick Sampling Valve.

## Oil Analysis Program Video Available on YouTube®

Donaldson recommends oil analysis as a fast and highly accurate way to assess what's in your engine's oil. An overview video is available on our YouTube channel as a resource for understanding our engine oil analysis program. This video reviews why a preventative maintenance program is important, how the analysis works, and how to read the lab report.

### SERVICE TRAINING VIDEOS



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

### Sample Processing/Reporting

Labs will request that you send your oil sample(s) as soon as possible after collecting. The oil samples do not "break down," but any long delay between sampling and analysis can be crucial if a unit is failing.

Once the oil sample reaches the lab, we will process it within 24 hours. You will be notified by phone/fax if critical conditions are present.

### Features of the Report:

- Up to 6 sets of test results (current and 5 previous) displayed
- Spectrochemical and physical results underlined where applicable
- Full headings for all results



## Lube Filtration Systems

The following pages present Donaldson's catalog product offering for Lube Assemblies. Product offering includes both by-pass and full-flow filtration designs.

Use the matrix below to determine the filtration system that best matches up with the flow requirements and the key features for design and mounting on your engine.

### Filter Performance Choices

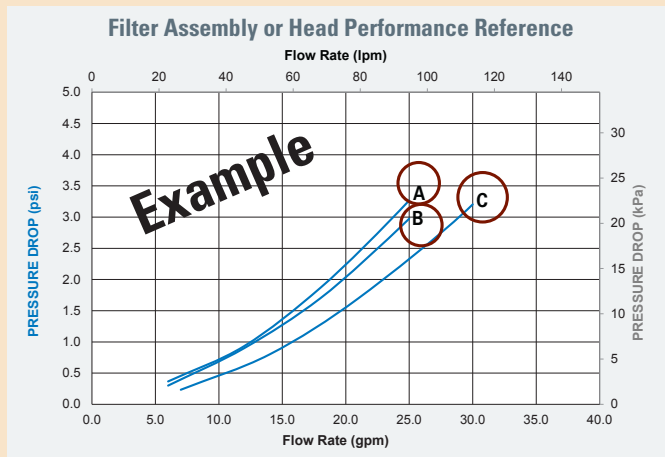
The filter tables provide you with the separate filters that fit the same head assembly – these differ by length and filter performance. Choices are presented by level of efficiency.



### Lube Filter Mix & Match Choices

Mix and Match Lube Filter Systems		
Families by Filter Diameter $\phi$	Flow Range	Features
93 mm / 3.54"	20 gpm / 76 lpm	Standard design for full flow filtration, top mount, single port head, spin-on filter
118 mm / 4.65"	1.75 gpm / 6.62 lpm @ 85 psi	Standard design for bypass filtration, side mount, single port heads, spin-on filter
	45 gpm / 170 lpm	Standard design for full flow filtration, top mount, single port head, spin-on filter

### How Donaldson Displays Filter Flow versus Pressure Loss Data



#### Performance Curve Notes

- Pressure loss was tested per the ISO 3968 standards.
- All flow measurements were made with Mobil DTE Light oil at 144°F (62.2°C), 15 cSt.
- Test conducted with a sample size of three filters.
- Filter performance curves will list an alpha reference (see circled areas on chart). These labels correspond with the filter choice tables.





# By-Pass Lube Filtration

Filter Dia. 118 MM (4.65") X 1 3/8"-16



**Flow Range: up to 1.75 gpm / 6.62 lpm**

**Operating Pressure**

Up to 150 psi (1034 kPa)

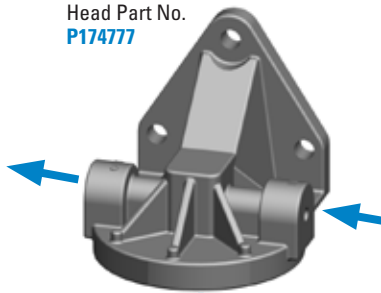
**Flow Rate**

1.75 gpm / 6.62 lpm @ 85 PSI

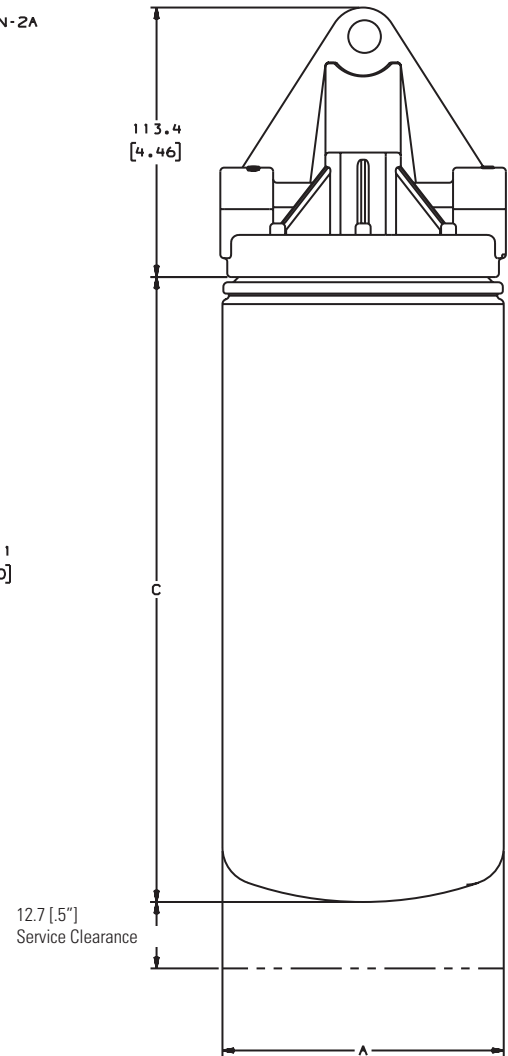
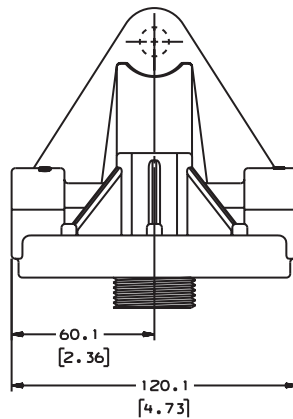
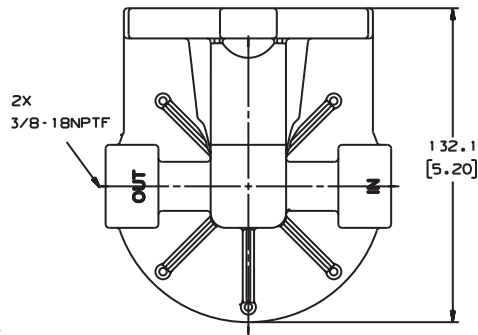
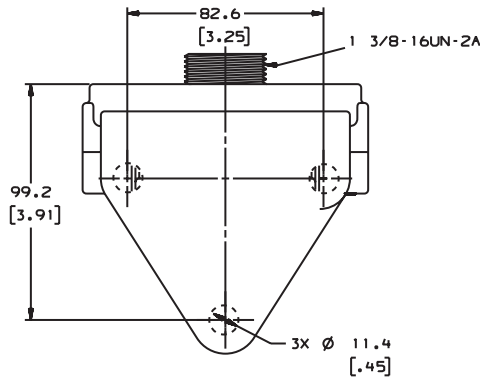
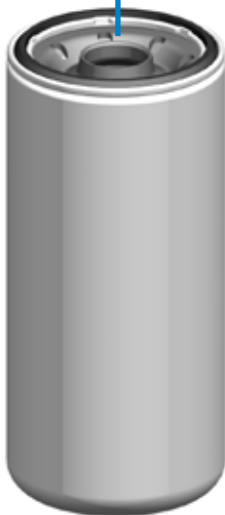
**Oil Compatibility**

Compatible with petroleum based fluids (hydrocarbon) and up to 20% biodiesel

Head Part No.  
**P174777**



Threaded stud not viewable, due to angle of view

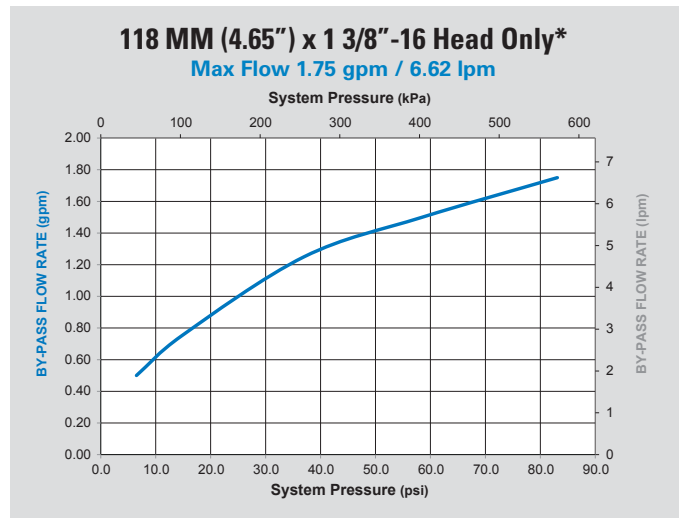
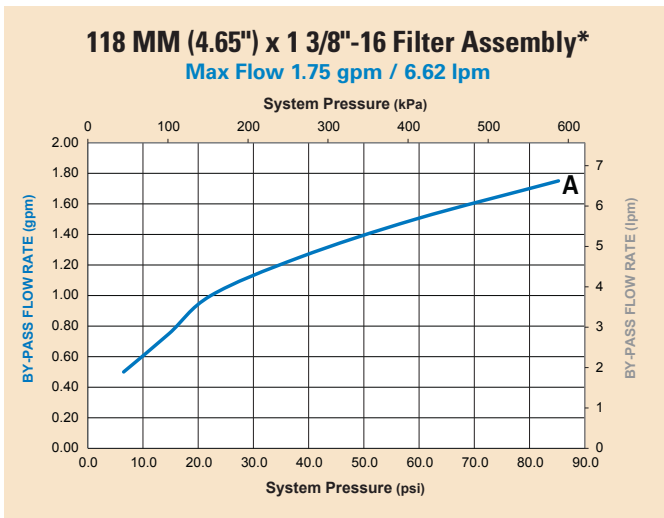




### Filter Selection Chart

Outer Diameter		(C) Filter Length		Media Type	Efficiency @ Micron	Part Number	Performance Curve	Gasket Outer Diameter		Gasket Inner Diameter	
in	mm	in	mm					in	mm	in	mm
4.65	118	8.94	227	Cellulose	99% @ 23	<b>P550777</b>	A	4.32	110	3.85	98

### Performance Curves



\*These performance curves represent clean filter by-pass flow as a function of system pressure.



# Full-Flow Lube Filtration

Filter Dia. 93 MM (3.66") X 1"-12



**Flow Range: up to 20 gpm / 76 lpm**

**Operating Pressure**

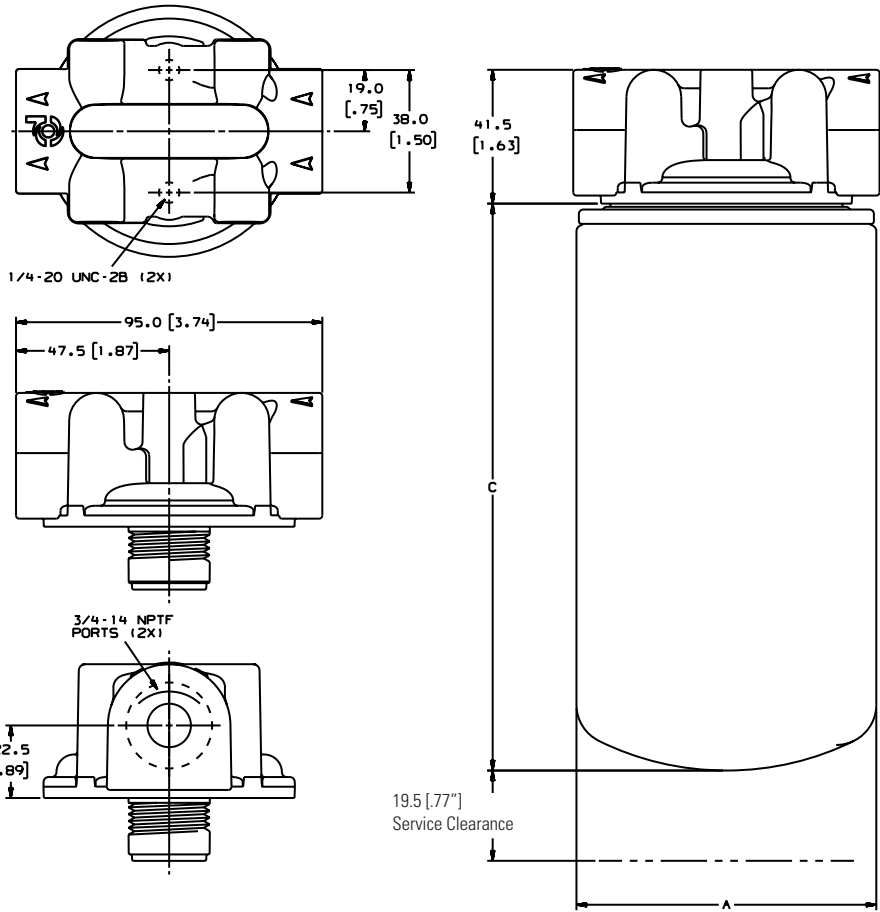
Up to 150 psi (1034 kPa)

**Flow Rate**

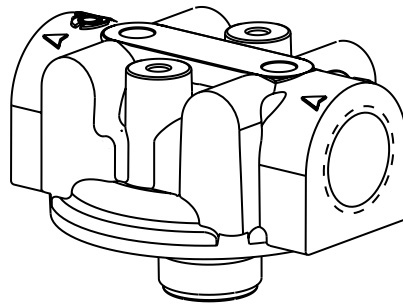
Up to 20 gpm / 76 lpm

**Oil Compatibility**

Compatible with petroleum based fluids (hydrocarbon) and up to 20% biodiesel



Head Part No.  
**P561134**

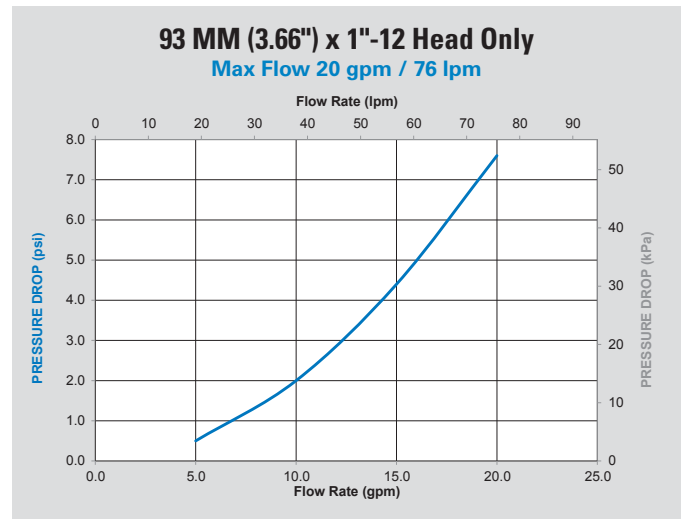
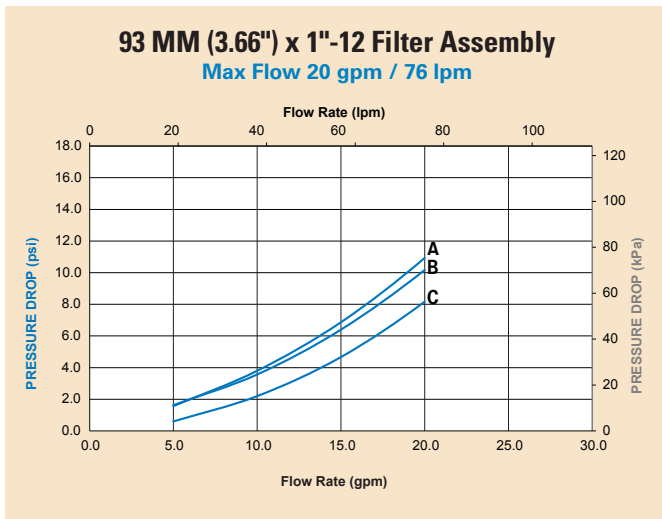




### Filter Selection Chart

Outer Diameter		(C) Filter Length		Media Type	Efficiency @ Micron	Part Number	Performance Curve	Anti-Drain Back Valve	Filter Relief Valve Setting		Stand Tube	Gasket Outer Diameter		Gasket Inner Diameter					
in	mm	in	mm						PSI	Bar		in	mm	in	mm				
3.66	93	5.35	136	Cellulose	99% @ 40	<a href="#">P552819</a>	B	Yes	18-23	1.30-1.60	No	2.83	72	2.42	61				
				Cellulose		<a href="#">P555680</a>	C		18-23	1.30-1.60	No								
		6.85	174	Cellulose		<a href="#">P553712</a>	C			No									
				Cellulose		<a href="#">P555616</a>	A	Yes			Yes								
				Cellulose		<a href="#">P557207</a>	C		7-10	0.50-0.70	No								
7.87	200	Cellulose	<a href="#">P553771</a>	A		Yes	35	2.41	No										
3.74	95	5.35	136	Cellulose		<a href="#">P559418</a>	B	Yes	36	2.48	No								
3.81	97	6.85	174	Cellulose		<a href="#">P558250</a>	B	Yes	11-17	0.80-1.00	No								

### Performance Curves





# Full-Flow Lube Filtration

Filter Dia. 118 MM (4.65") X 1 1/2"-12



**Flow Range: up to 45 gpm / 170 lpm**

**Operating Pressure**

Up to 150 psi (1034 kPa)

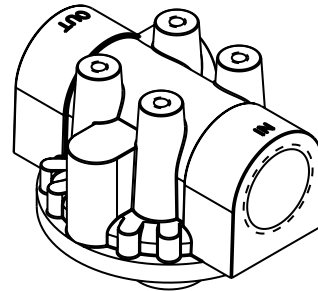
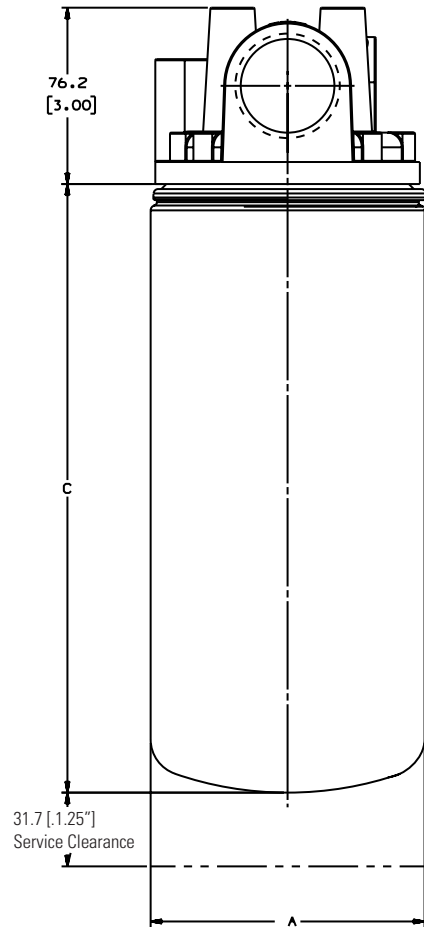
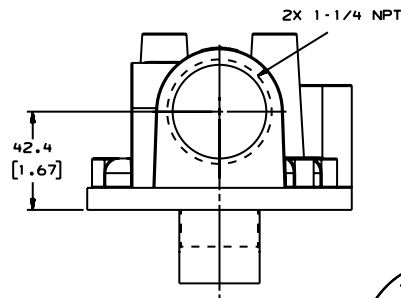
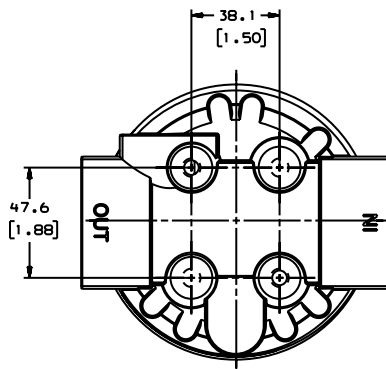
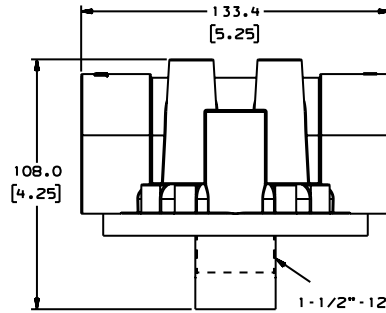
**Flow Rate**

Up to 45 gpm / 170 lpm

**Oil Compatibility**

Compatible with petroleum based fluids (hydrocarbon) and up to 20% biodiesel

Head Part No.  
**P174780**

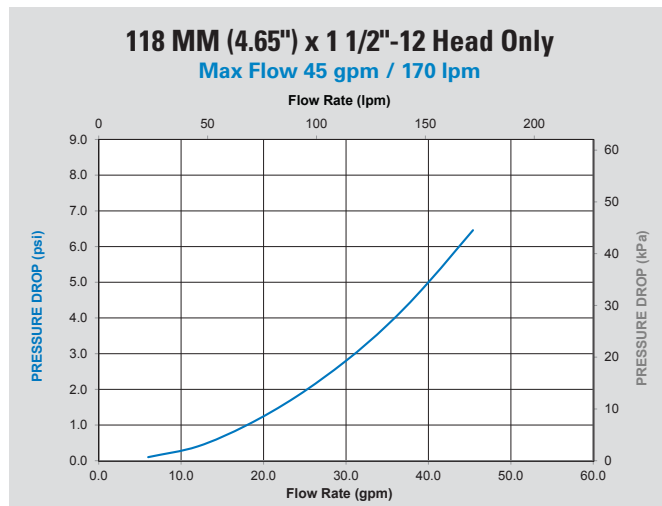
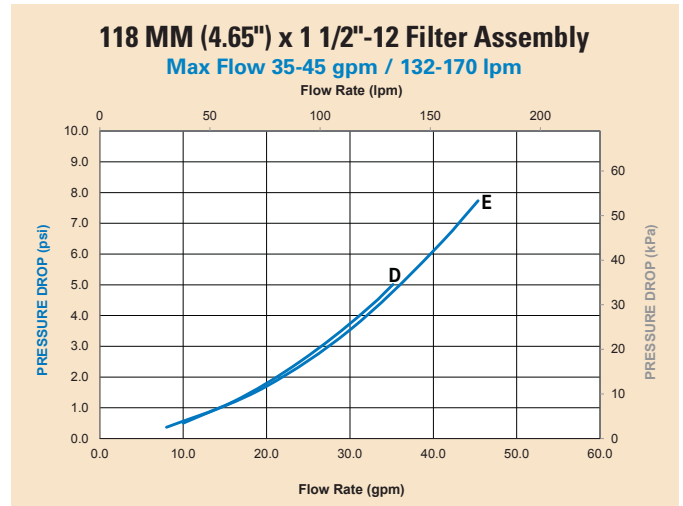
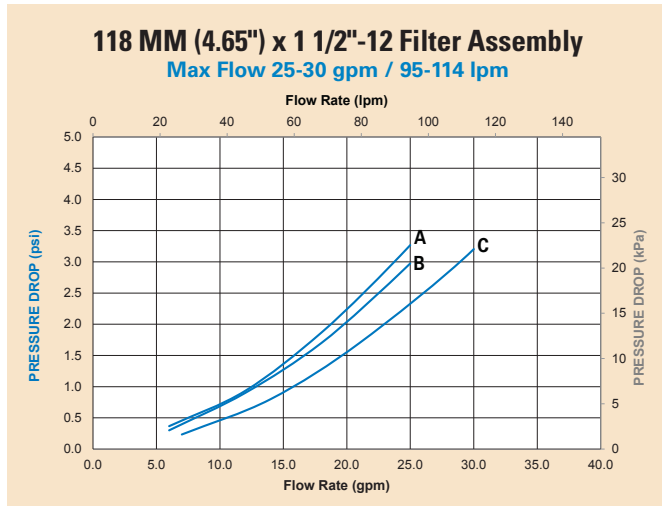




### Filter Selection Chart

Max. Recommended Flow Rate		Outer Diameter		(C) Filter Length		Media Type	Efficiency @ Micron	Part Number	Performance Curve	Gasket Outer Diameter		Gasket Inner Diameter	
gph	lph	in	mm	in	mm					in	mm	in	mm
25	95	4.65	118	6.22	158	Cellulose	99% @ 23	<b>P550947</b>	A	4.32	110	3.85	98
						Synteq	99% @ 16	<b>DBL7947</b>	B	4.31	109	3.84	98
30	114			7.83	199	Cellulose	99% @ 40	<b>P551381</b>	C	4.32	110	3.85	98
35	132			8.94	227	Cellulose	99% @ 23	<b>P550671</b>	D	4.32	110	3.85	98
45	170			10.24	260	Synteq	99% @ 16	<b>DBL7670</b>	E	4.31	109	3.84	98
				Cellulose	99% @ 23	<b>P551670</b>	E	4.32	110	3.85	98		

### Performance Curves





## Spin-On Filters

Thread	OD		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting		GSKT O.D.		GSKT I.D.	
	IN	MM	IN	MM						PSI	Bar	IN	MM	IN	MM
<b>68 mm / 2.68" Diameter Family</b>															
3/4-16	2.56	65	2.80	71	<b>P502015</b>	FULL FLOW	50% @ 20	TOYOTA 90915-03001, 90915-10001	Yes	11-17	0.80-1.00	2.46	62	1.94	49
	2.56	65	3.54	90	<b>P502019</b>	FULL FLOW	50% @ 20	TOYOTA 90915-03004				2.46	62	1.94	49
	2.56	65	3.35	85	<b>P502070</b>	FULL FLOW		NISSAN 1520853J00				2.46	62	2.06	52
	2.56	65	2.80	71	<b>P550534</b>	FULL FLOW		DATSUN, TOYOTA SUZUKI	Yes	11-17	0.80-1.00	2.46	62	1.94	49
	2.68	68	2.56	65	<b>P502024</b>	FULL FLOW	50% @ 20	BRIGGS & STRATON 492932, SUZUKI, DAIHATSU, MAZDA	Yes	11-17	0.80-1.00	2.56	65	2.20	56
M20 x 1.5	2.68	68	3.34	85	<b>P502007</b>	FULL FLOW	50% @ 20	MAZDA FEY014302	Yes	11-17	0.80-1.00	2.67	68	2.15	55
	2.68	68	3.35	85	<b>P502047</b>	FULL FLOW	50% @ 20	ISUZU 94314263				2.58	66	2.15	55
	2.68	68	3.35	85	<b>P502057</b>	BYPASS	50% @ 20	MAZDA FEY014302	Yes			2.56	65	3.03	77
	2.68	68	2.56	65	<b>P502062</b>	FULL FLOW	50% @ 20	KIA				2.58	66	2.17	55
	2.68	68	3.35	85	<b>P502063</b>	FULL FLOW	50% @ 20	MAZDA JEY014302	Yes	11-17	0.80-1.00	2.58	66	2.15	55
	2.68	68	2.56	65	<b>P502067</b>	FULL FLOW	50% @ 20	NISSAN, MAZDA, MITSUBISHI	Yes	11-17	0.80-1.00	2.56	65	2.19	56
	2.69	68	2.78	71	<b>P551783</b>	FULL FLOW		HONDA 15410MM90003				2.42	61	2.23	57
<b>76 mm / 3.00" Diameter Family</b>															
3/4-16	2.92	74	3.40	86	<b>P552430</b>	FULL FLOW	50% @ 24	HARLEY-DAVIDSON 63805-80A				2.73	69	2.42	61
	2.92	74	4.53	115	<b>P551763</b>	FULL FLOW		KOHLER 1205001, CUB CADET	Yes	8	0.55	2.73	69	2.43	62
	2.91	74	3.31	84	<b>P502016</b>	FULL FLOW	99% @ 50	TOYOTA 90915-03002, 90915-20001							
	3.00	76	3.46	88	<b>P502107</b>	FULL FLOW	50% @ 20	ECHLIN OF18				2.80	71	2.50	64
	3.00	76	3.40	86	<b>P550335</b>	FULL FLOW	50% @ 20	MOPAR L335, CHRYSLER, CLARK, INTERCEPTOR MARINE	Yes	7-10	0.50-0.70	2.75	70	2.37	60
	2.99	76	4.72	120	<b>P554770</b>	FULL FLOW	50% @ 20	JOHN DEERE AM34770	Yes	26-30	1.80-2.10	2.75	70	2.37	60
	3.00	76	3.42	87	<b>P551251</b>	FULL FLOW		OPEL 2866477		8-11	.60-.80				
	3.00	76	4.74	120	<b>P550400</b>	FULL FLOW	99% @ 40	FORD E1FZ6731A, MOTORCRAFT FL400	Yes	7-10	0.50-0.70	2.75	70	2.37	60
	3.00	76	5.53	140	<b>P554408</b>	FULL FLOW	99% @ 48	PERKINS 2654408, MF	Yes	8-11	0.60-0.80	2.83	72	2.44	62
13/16-16	2.92	74	4.83	123	<b>P550598</b>	FULL FLOW	50% @ 25	GM 25010324				2.73	69	2.43	62
	2.96	75	4.45	113	<b>P550505</b>	FULL FLOW	99% @ 40	GM LIGHT TRUCK, AC PF59, PH59	Yes			2.77	70	2.36	60
	2.99	76	3.41	87	<b>P551307</b>	FULL FLOW	99% @ 40	GM 6439857,25010325	Yes			2.84	72	2.47	63
M18 x 1.5	3.00	76	3.40	86	<b>P550047</b>	FULL FLOW	99% @ 45	AMC, GMC 25010792	Yes	7-9	0.50-0.60	2.76	70	2.39	61
	3.00	76	5.09	129	<b>P550051</b>	FULL FLOW	99% @ 45	GMC 25010908	Yes			2.76	70	2.39	61
M20 x 1.5	2.96	75	4.75	121	<b>P552849</b>	FULL FLOW	99% @ 36	FORD, MAZDA	Yes	11-17	0.80-1.00	2.70	69	2.33	59
	3.00	76	2.52	64	<b>P502010</b>	FULL FLOW		MITSUBISHI MD322508				2.48	63	2.03	52
M22 x 1.5	3.00	76	3.26	83	<b>P550794</b>	FULL FLOW		GM 2007 LIGHT TRUCK							
<b>80 mm / 3.15" Diameter Family</b>															
3/4-16	3.15	80	3.15	80	<b>P502020</b>	FULL FLOW	50% @ 20	TOYOTA				2.48	63	2.20	56
	3.15	80	2.95	75	<b>P502022</b>	FULL FLOW	50% @ 20	ATLAS COPCO, BMW, DAIHATSU, SUZUKI	Yes	11-17	0.80-1.00	2.48	63	2.03	52
	3.15	80	2.72	69	<b>P502069</b>	FULL FLOW	50% @ 20	NISSAN 1520801B10				2.46	62	2.00	51
	3.24	82	4.40	112	<b>P550715</b>	FULL FLOW	99% @ 40	KUBOTA 15426-32430	Yes	16-19	1.00-1.30	2.58	66	2.26	57
	3.24	82	3.90	99	<b>P550711</b>	FULL FLOW	99% @ 45	NISSAN 15208-H8911	Yes			2.26	57		



Thread	OD		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting		GSKT O.D.		GSKT I.D.	
	IN	MM	IN	MM						PSI	Bar	IN	MM	IN	MM
M20 x 1.5	3.12	79	3.87	98	P555522	FULL FLOW	99% @ 50	THERMOKING 11.5522, J.DEERE, YANMAR	Yes	11-17	0.80-1.00	2.45	62	2.15	55
	3.15	80	2.52	64	P502009	FULL FLOW	50% @ 20	mitsubishi MD136466	Yes	11-17	0.80-1.00	2.48	63	2.03	52
	3.15	80	3.15	80	P502049	FULL FLOW	50% @ 20	HONDA 15400-PR3-004				2.49	63	2.00	51
	3.16	80	5.64	143	P502056	FULL FLOW	50% @ 20	MAZDA 145623802,145623802A ,RF0323802				2.50	64	2.28	58
	3.15	80	3.94	100	P502051	FULL FLOW		HONDA 15400-PH1-014, 15400-PK1-003	Yes	11-17	0.80-1.00	2.48	63	1.81	46
	3.15	80	3.15	80	P550776	FULL FLOW		KUBOTA 7000015241	Yes	10-15		2.48	63		
	3.15	80	3.98	101	P550405	FULL FLOW	99% @ 40	HINO 23304-78020				2.48	63	1.81	46
	3.18	81	3.39	86	P550162	FULL FLOW	99% @ 39	ISUZU, HONDA	Yes	11-17	0.80-1.00	2.50	64	2.11	54
M22 x 1.5	3.15	80	3.94	100	P550389	FULL FLOW	50% @ 25	ISUZU 8941145840	Yes	8-11	0.60-0.80	2.48	63	1.99	51
	3.15	80	3.17	81	P550600	FULL FLOW		HONDA 15400PL2004, 005, 305				2.94	75	2.43	62
<b>85 mm / 2.68" Diameter Family</b>															
3/4-16	3.31	84	4.92	125	P550078	FULL FLOW	50% @ 20	TOYOTA 15601-33010	Yes			2.47	63	2.25	57
	3.31	84	3.93	100	P550227	FULL FLOW	99% @ 45	SUBARU, PINTO, DATSUN	Yes			2.47	63	2.25	57
2 3/4-5	3.33	85	4.84	123	P552451	BYPASS		WISCONSIN RV40							
M20 x 1.5	3.28	83	2.78	71	P550726	FULL FLOW	99% @ 40	KUBOTA 15841-32430, 15841-32431		11-15	0.80-1.00	2.52	64	2.26	57
	3.43	87	3.50	89	P502076	FULL FLOW	50% @ 20	PEUGEOT 110951				3.33	85	2.81	71
<b>93 mm / 3.54" Diameter Family</b>															
1-12	3.66	93	5.08	129	P502068	COMBINATION		NISSAN 1520840L00, 1520820N00	Yes			2.87	73	2.00	51
	3.66	93	5.35	136	P552819	FULL FLOW	50% @ 20	DEUTZ, CLARK, HYSTER	Yes	18-23	1.30-1.60	2.81	71	2.42	61
	3.66	93	5.35	136	P555680	FULL FLOW	50% @ 20	CAT 9N-5680		18-23	1.30-1.60	2.81	71	2.42	61
	3.66	93	6.85	174	P553712	FULL FLOW	50% @ 20	CARRIER, ATLAS COPCO, THERMOKING 11.3712				2.81	71	2.42	61
	3.66	93	6.85	174	P557207	FULL FLOW	50% @ 20	IHC 427207C2		7-10	0.50-0.70	2.81	71	2.42	61
	3.66	93	6.85	174	P555616	FULL FLOW	99% @ 40	IHC 675616C91, CASE	Yes			2.81	71	2.42	61
	3.67	93	6.88	175	P551297	FULL FLOW	99% @ 45	KOMATSU/KOMATSU DRESSER 6002115213	Yes	18-21	1.30-1.50	2.85	72	2.47	63
	3.66	93	7.87	200	P553771	FULL FLOW	50% @ 20	DEUTZ 1174421, CASE IH	Yes	35	2.41	2.81	71	2.42	61
	3.67	93	8.00	203	P551262	FULL FLOW		NAVISTAR 1808896C1				2.85	72	2.47	63
	3.70	94	3.75	95	P550710	FULL FLOW	99% @ 40	KOMATSU 600-211-6140	Yes	34-37	2.40-2.60	2.85	72	2.45	62
	3.69	94	6.99	178	P552411	FULL FLOW		CASE 528250R1				2.73	69	2.42	61
	3.70	94	8.30	211	P550562	FULL FLOW		LIEBHERR 5700043				2.83	72	2.48	63
	3.73	95	4.22	107	P550719	FULL FLOW	99% @ 40	IHC 3136046R93		20-24	1.40-1.70	2.78	71	2.43	62
	3.74	95	5.47	139	P559418	FULL FLOW	50% @ 20	DEUTZ 1174418	Yes	36	2.48	2.81	71	2.42	61
	3.75	95	6.99	178	P550362	FULL FLOW	99% @ 40	DEUTZ 1174419	Yes	30	2.07				
	3.74	95	8.31	211	P550317	FULL FLOW	99% @ 40	RENAULT RVI 5000670671	Yes	34-37	2.40-2.60	2.80	71	2.40	61
3.81	97	6.78	172	P558250	FULL FLOW	99% @ 40	IHC 528250R91,	Yes	11-17	0.80-1.00	2.81	71	2.42	61	
1-16	3.66	93	5.35	136	P558616	FULL FLOW	50% @ 20	CUMMINS 3903224, 3908616				2.81	71	2.42	61
	3.66	93	5.35	136	DBL7345	FULL FLOW	99% @ 15	EXTENDED SERVICE CUMMINS 4B 3.9 SERIES LUBE				2.81	71	2.42	61
	3.66	93	5.35	136	P551017	FULL FLOW	99% @ 15	CUMMINS ISB				2.83	72	2.44	62
	3.66	93	6.50	165	P502503	FULL FLOW	99% @ 15	FORD 2011 LIGHT TRUCK	Yes			2.64	67	2.44	62
	3.66	93	6.85	174	P551018	FULL FLOW	99% @ 15	CUMMINS ISC ENGINES 3934430				2.64	67	2.44	62
	3.66	93	6.85	174	P558615	FULL FLOW	50% @ 20	CUMMINS 3932217, 3908615				2.81	71	2.42	61
	3.67	93	6.87	174	P551265	FULL FLOW		DAEWOO 65055105009				2.83	72	2.46	62
	3.66	93	6.85	174	DBL7349	FULL FLOW	99% @ 15	EXTENDED SERVICE CUMMINS 4B & 6B SERIES LUBE				2.81	71	2.42	61



## Spin-On Filters

Thread	OD		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting		GSKT O.D.		GSKT I.D.	
	IN	MM	IN	MM						PSI	Bar	IN	MM	IN	MM
<b>93 mm / 3.54" Diameter Family, continued</b>															
7/8-14	3.67	93	3.75	95	<a href="#">P551287</a>	FULL FLOW	50% @ 25	CATERPILLAR 9M-8755		17-19	1.20-1.30	2.85	72	2.45	62
3/4-16	3.67	93	2.22	56	<a href="#">P551784</a>	FULL FLOW		LISTER PETER 75110620				2.75	70	2.43	62
	3.66	93	3.30	84	<a href="#">P551042</a>	FULL FLOW		BOBCAT 6678233				2.83	72	2.44	62
	3.66	93	3.39	86	<a href="#">P550939</a>	FULL FLOW	99% @ 40	KUBOTA 1732132430		10	.70	2.83	72	2.46	62
	3.66	93	3.57	91	<a href="#">P550939</a>	FULL FLOW	50% @ 21	CUMMINS C6002112110		16	1.10	2.83	72	2.46	63
	3.66	93	4.21	107	<a href="#">P552518</a>	FULL FLOW	99% @ 40	DODGE 6CYL-225,V8-318, CHYRYS, FORD & OTHERS	Yes	7-10	0.50-0.70	2.81	71	2.42	61
	3.67	93	5.32	135	<a href="#">P169071</a>	FULL FLOW	99% @ 22	HIGH EFFICIENCY VERSION OF P550008	Yes	8-11	0.60-0.80	2.85	72	2.47	63
3/4-16	3.66	93	5.35	136	<a href="#">P550008</a>	FULL FLOW	50% @ 20	FORD, MOTORCRAFT FL1A		7-10	0.50-0.70	2.81	71	2.42	61
	3.66	93	5.35	136	<a href="#">P554403</a>	FULL FLOW	50% @ 20	PERKINS 2654403, MF	Yes	7-10	0.50-0.70	2.81	71	2.41	61
	3.66	93	5.35	136	<a href="#">P557780</a>	FULL FLOW	50% @ 20	ISUZU, NISSAN	Yes	18-23	1.30-1.60	2.81	71	2.42	61
	3.66	93	5.87	149	<a href="#">P550006</a>	FULL FLOW	99% @ 40	MERCEDES, RVI		36	2.5	2.81	71	2.44	62
	3.66	93	6.85	174	<a href="#">P550299</a>	FULL FLOW	99% @ 40	FORD D3HZ6731B, MOTORCRAFT FL788	Yes	7-10	0.50-0.70	2.81	71	2.42	61
	3.66	93	6.86	174	<a href="#">P554407</a>	FULL FLOW	99% @ 48	PERKINS 2654407	Yes	8-11	0.60-0.80	2.82	72	2.48	63
	3.66	93	4.21	107	<a href="#">P550942</a>	FULL FLOW	99% @ 40	KUBOTA 1540232090	Yes	34-37	2.40-2.60	2.80	71	2.48	63
	3.66	93	4.21	107	<a href="#">P550941</a>	FULL FLOW	99% @ 40	CASE, DAVID BROWN, TOYOTA		18-20	1.30-1.40	2.84	72	2.47	63
	3.69	94	5.54	141	<a href="#">P553411</a>	FULL FLOW	99% @ 40	ALLIS CHALMERS, WORTHINGTON, FORD	Yes	18-20	1.30-1.40	3.50	89	2.79	71
	3.74	95	3.62	92	<a href="#">P550318</a>	FULL FLOW	50% @ 25	SCANIA 173171	Yes	14-20	1.00-1.40	2.81	71	2.42	61
	3.72	95	3.95	100	<a href="#">P550963</a>	FULL FLOW	50% @ 20	DODGE LIGHT TRUCK	Yes	8-16	0.60-1.10	2.84	72	2.48	63
	3.66	97	3.58	91	<a href="#">P550939</a>	FULL FLOW	99% @ 40	ATLAS COPCO 10300882, FORD, MACK		10 - 20	0.80-1.20	2.82	72	2.42	61
	3.81	97	3.72	95	<a href="#">P550939</a>	FULL FLOW	99% @ 36	FORD, ONAN		8-11	0.60-0.80	2.82	72	2.42	61
	3.82	97	3.98	101	<a href="#">P550942</a>	FULL FLOW	50% @ 10	ZETTELMEYER 2138220		36	2.48	2.80	71	2.40	61
	5/8-18	3.73	95	4.31	109	<a href="#">P550154</a>	BYPASS	99% @ 45	IHC 538836R1				2.83	72	2.46
3.81		97	5.22	133	<a href="#">P550050</a>	BYPASS	99% @ 45	CAT, AMC, MF, ALLIS 74512207				2.82	72	2.42	61
3.81		97	5.68	144	<a href="#">P550194</a>	FULL FLOW		WISCONSIN RV38	Yes	12-15	0.80-1.00				
3.81		97	7.91	201	<a href="#">P553404</a>	BYPASS	99% @ 45	CARRIER TRANSICOLD 30.00304.00				2.82	72	2.42	61
3/4-20	3.69	94	5.43	138	<a href="#">P552363</a>	BYPASS	50% @ 21	THERMO KING 116228				2.83	72	2.46	63
1 1/2-16	3.70	94	5.51	140	<a href="#">P551352</a>	FULL FLOW	99% @ 48	JOHN DEERE RE59754				3.76	96	3.22	82
1 1/8-16	3.66	93	6.81	173	<a href="#">P551348</a>	FULL FLOW	50% @ 16	mitsubishi C45702411 , WP110				2.80	71	2.01	51
	3.66	93	6.85	174	<a href="#">P551019</a>	FULL FLOW	99% @ 15	CUMMINS B SERIES				2.83	72	2.44	62
	3.66	93	6.85	174	<a href="#">P550428</a>	FULL FLOW	50% @ 20	CUMMINS "98" B SERIES				2.84	72	2.44	62
	3.81	97	5.22	133	<a href="#">P555570</a>	FULL FLOW	99% @ 45	CAT 8N-9586, 9N-5570				2.81	71	2.42	61
13/16-16	3.66	93	4.34	110	<a href="#">P550551</a>	BYPASS		WISCONSIN RV51				3.44	87	3.10	79
	3.66	93	4.34	110	<a href="#">P550599</a>	FULL FLOW		GM 6437462				2.83	72	2.46	63
	3.66	93	7.87	200	<a href="#">P550832</a>	FULL FLOW	50% @ 20	GMC 6439034				3.38	86	3.04	77
	3.69	94	5.20	132	<a href="#">P551764</a>	FULL FLOW		GM 6438868				3.44	87	3.10	79
	3.69	94	5.36	136	<a href="#">P550518</a>	FULL FLOW	99% @ 20	AC PF2232 2001 SILVERADO V8 400 6.6L F.I.	Yes	11-17	0.80-1.00	3.48	88	3.10	79
	3.73	95	5.37	136	<a href="#">P166564</a>	FULL FLOW	99% @ 22	GM CAR & TRUCK				3.45	88	3.00	76
	3.77	96	3.08	78	<a href="#">P550507</a>	FULL FLOW	99% @ 22	GM LIGHT TRUCK, AC PF454, PH454	Yes			3.57	91	3.16	80
	3.78	96	5.14	131	<a href="#">P550964</a>	FULL FLOW	99% @ 35	GM LIGHT TRUCK	Yes			3.38	86	3.04	77
	3.81	97	4.22	107	<a href="#">P550025</a>	FULL FLOW	99% @ 40	GMC 6CYL. & V8 GAS				3.38	86	3.04	77
	3.81	97	5.12	130	<a href="#">P550035</a>	FULL FLOW	50% @ 20	GM, ACPF35				3.38	86	3.04	77
	3.81	97	5.22	133	<a href="#">P550024</a>	FULL FLOW	99% @ 40	ALLIS CHALMERS, CASE, IHC	Yes			2.82	72	2.42	61
	3.81	97	5.53	140	<a href="#">P550020</a>	FULL FLOW	99% @ 40	JOHN DEERE AR58956, T19044		18-23	1.30-1.60	2.81	71	2.42	61



Thread	OD		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting		GSKT O.D.		GSKT I.D.	
	IN	MM	IN	MM						PSI	Bar	IN	MM	IN	MM
2 3/4-4	3.54	90	4.86	123	<b>P558717</b>	BYPASS		CASE A36136, HYSTER 38714, MF 835652M91							
	3.79	96	6.02	153	<b>P552404</b>	BYPASS	50% @ 10	OLIVER 100126ASA; WHITE 1LA5507				3.05	77	2.68	68
	3.79	96	8.13	206	<b>P552464</b>	FULL FLOW		OLIVER 250046, 100125ASA; WAUKESHA 119390A, K5507				3.05	77	2.68	68
M18 x 1.5	3.70	94	3.72	95	<b>P550242</b>	BYPASS	50% @ 25	mitsubishi ME014838	Yes	8-11	0.60-0.80	2.46	62	2.20	56
M20 x 1.5	3.52	89	3.23	82	<b>P502092</b>	FULL FLOW	50% @ 20	PROTON				2.44	62	1.98	50
	3.54	90	3.93	100	<b>P502039</b>	FULL FLOW	50% @ 20	ISUZU 8944309830				3.43	87	3.01	76
	3.66	93	3.95	100	<b>P550933</b>	FULL FLOW	50% @ 19	ISUZU 8-9421-7272-0				3.42	87	3.01	76
	3.64	92	4.92	125	<b>P550412</b>	BYPASS	50% @ 5	MAZDA SL5014V61				3.43	87	2.08	53
	3.66	93	3.39	86	<b>P550935</b>	FULL FLOW		CHRYSLER		8-10	0.60-0.70	2.63	67		
	3.66	93	5.35	136	<b>P550934</b>	FULL FLOW	99% @ 40	FORD E3TZ6731C		8-11	0.60-0.80	2.82	72	2.42	61
M22 x 1.5	3.54	90	3.18	81	<b>P502048</b>	FULL FLOW	50% @ 20	HONDA 15400-PA6-305				2.52	64	2.27	58
	3.64	92	5.47	139	<b>P502072</b>	FULL FLOW	50% @ 20	MOTORCRAFT				2.75	70		
	3.67	93	3.58	91	<b>P550965</b>	FULL FLOW	50% @ 20	FORD LIGHT TRUCK	Yes	15	1.03	2.81	71	2.42	61
	3.67	93	5.42	138	<b>P550166</b>	FULL FLOW	99% @ 45	ONAN 122-0550		17-22	1.20-1.50	2.83	72	2.46	62
	3.78	96	3.78	96	<b>P550357</b>	FULL FLOW		FORD 844F6716AA	Yes	10-15	0.70-1.00	3.54	90	3.03	77
	3.82	97	5.51	140	<b>P553315</b>	FULL FLOW		FORD 785F-6714-AA3A				2.82	72	2.45	62
M24 x 1.5	3.66	93	5.35	136	<b>P550758</b>	FULL FLOW	99% @ 40	JOHN DEERE RE519626, RE518977		24	1.70	2.83	72	2.44	62
	3.75	95	6.88	175	<b>P550975</b>	FULL FLOW		VALMET 836136342	Yes	34-37	2.40-2.60				
M26 x 1.5	3.54	90	4.92	125	<b>P502043</b>	COMBINATION	50% @ 20	ISUZU 8943604271				3.44	87	3.00	76
	3.58	91	4.92	125	<b>P502058</b>	COMBINATION	50% @ 20	DAIHATSU, ISUZU, MAZDA				3.43	87	3.00	76
	3.66	93	6.92	176	<b>P557382</b>	COMBINATION	99% @ 25	THERMO KING 117382,				2.81	71	2.42	61
M27 x 2	3.85	98	6.89	175	<b>P550520</b>	FULL FLOW		DAF 1399494				2.83	72	2.44	62
M92 x 2.5-6H	3.66	93	5.94	151	<b>P550779</b>	FULL FLOW	99% @ 40	JOHN DEERE RE504836							
<b>100 mm / 3.94" Diameter Family</b>															
1-12	3.96	101	4.92	125	<b>P502060</b>	FULL FLOW	50% @ 20	MAZDA TFY014302	Yes	11-17	0.80-1.00	3.92	100	3.48	88
	3.96	101	4.92	125	<b>P550411</b>	FULL FLOW		MAZDA 130523802		11-17	0.80-1.00	3.92	100	3.48	88
	3.98	101	5.85	149	<b>P505956</b>	FULL FLOW		HINO							
	4.02	102	5.91	150	<b>P550409</b>	FULL FLOW	50% @ 16	MAZDA SL0223802				3.92	100	3.46	88
	4.02	102	5.91	150	<b>P502080</b>	FULL FLOW	50% @ 20	mitsubishi 32B4000100	Yes			3.91	99	3.46	88
	4.00	102	5.92	150	<b>P550422</b>	FULL FLOW		HITACHI 4183853, ISUZU 8943212191	Yes	17	1.20	3.92	100	3.48	88
	4.02	102	5.91	150	<b>P502476</b>	FULL FLOW	99% @ 39	mitsubishi 32B4020100	Yes			3.90	99	3.46	88
M24 x 1.5	3.93	100	3.30	84	<b>P502017</b>	COMBINATION	50% @ 5	TOYOTA 90915-03003, 90915-30001	Yes	11-17	0.80-1.00	3.15	80		
M26 x 1.5	4.02	102	4.92	125	<b>P502061</b>	COMBINATION		MAZDA VSY114302				3.35	85	2.17	55
	4.02	102	5.31	135	<b>P551343</b>	BYPASS	50% @ 16	mitsubishi MD069782	Yes	12-16	0.80-1.00	2.87	73	1.77	45
	4.02	102	6.02	153	<b>P550406</b>	FULL FLOW	50% @ 16	HINO 156071480	Yes	11-17	0.80-1.00	2.87	73	2.20	56





## Spin-On Filters

Thread	OD		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting		GSKT O.D.		GSKT I.D.	
	IN	MM	IN	MM						PSI	Bar	IN	MM	IN	MM
<b>108 mm / 4.25" Diameter Family</b>															
1-12	4.21	107	3.96	101	<b>P502085</b>	FULL FLOW	50% @ 20	MITSUBISHI 32A4000100	Yes	18-24	1.30-1.70	3.90	99	3.46	88
	4.25	108	5.14	131	<b>P502032</b>	COMBINATION	50% @ 20	ISUZU 8941432050				2.90	74	2.15	55
	4.23	107	5.79	147	<b>P559126</b>	FULL FLOW	99% @ 40	FORD E7HZ6731A (BRAZILIAN CAB FORWARD)		18-23	1.30-1.60	2.82	72	2.42	61
	4.25	108	6.61	168	<b>P553871</b>	FULL FLOW	50% @ 20	THERMOKING 11.3871				2.82	72	2.42	61
	4.27	108	8.00	203	<b>P550319</b>	FULL FLOW	99% @ 25	IHC 1811953C1 FOR DT/DTA360 & 466 DIESEL ENG				2.82	72	2.42	61
	4.27	108	9.09	231	<b>P550393</b>	FULL FLOW	99% @ 40	MERCEDES TRUCK 0031841701				2.82	72	2.44	62
	4.25	108	9.13	232	<b>P551604</b>	FULL FLOW	50% @ 14	FIAT 71909137, IVECO 01901604	Yes	18-20	1.30-1.40	2.81	71	2.46	62
1-16	4.28	109	5.78	147	<b>P550152</b>	FULL FLOW	99% @ 40	FIAT ALLIS, A.CHALMERS 4023548-3				2.83	72	2.45	62
	4.28	109	7.33	186	<b>P552474</b>	FULL FLOW		ALLIS CHALMERS 4037047				2.83	72	2.46	63
7/8-16	4.27	108	8.06	205	<b>P550714</b>	FULL FLOW	99% @ 40	WHITE 30-3068145	Yes	18-25	1.30-1.70	2.82	72		
	4.23	108	7.95	202	<b>P559130</b>	FULL FLOW	99% @ 40	CASEIH A62423				2.83	72	2.44	62
3/4-16	4.24	108	6.59	167	<b>P551267</b>	FULL FLOW	99% @ 30	NISSAN 15201Z9008				2.82	72	2.46	62
	4.26	108	7.25	184	<b>P551603</b>	FULL FLOW	99% @ 23	FIAT 71909101, IVECO 01901603, HESSTON	Yes	30	2.07	2.83	72	2.44	62
	4.28	109	3.77	96	<b>P550580</b>	FULL FLOW	99% @ 45	FORD, MASSEY FERGUSON, MPLS MOLINE	Yes	8-11	0.60-0.80	2.81	71	2.42	61
	4.40	112	5.70	145	<b>P550226</b>	FULL FLOW	50% @ 4	IVECO 1902047	Yes	20-23	1.30-1.80	2.83	72	2.44	62
3/4-20	4.28	109	7.89	200	<b>P553746</b>	BYPASS	99% @ 12	THERMO KING 11.3746				2.83	72	2.45	62
1 1/2-12	4.25	108	10.42	265	<b>P502081</b>	FULL FLOW	50% @ 16	MITSUBISHI 3754001101				4.02	102	3.42	87
1-1/2-16	4.23	107	5.79	147	<b>P559127</b>	FULL FLOW	99% @ 40	FORD E3TZ6731A, IHC 6.9L 1804442C1				3.89	99	3.55	90
	4.27	108	8.02	204	<b>P550371</b>	FULL FLOW	99% @ 25	NAVISTAR 1822731C1, 1814562C1 FORD F4TZ-6731-A				3.89	99	3.55	90
1 1/8-16	4.26	108	6.57	167	<b>P550086</b>	FULL FLOW	50% @ 20	KOMATSU 6136-51-5120		11-17	0.80-1.00	3.89	99	3.55	90
	4.24	108	6.56	167	<b>P550708</b>	FULL FLOW	99% @ 45	KOMATSU 6134-51-5120	Yes	27	1.86	3.94	100	3.58	91
	4.24	108	6.73	171	<b>P551266</b>	FULL FLOW		NISSAN FL201Z9010				4.01	102	3.60	91
	4.24	108	7.02	178	<b>P551263</b>	FULL FLOW		VOLVO 8477416				3.94	100	3.56	90
	4.25	108	10.24	260	<b>P550519</b>	FULL FLOW		M&H W11102/20							
	4.25	108	10.31	262	<b>P554004</b>	FULL FLOW	50% @ 20	CATERPILLAR 1R-0658, 2P-4004				3.89	99	3.55	90
	4.24	108	10.32	262	<b>P553191</b>	FULL FLOW	50% @ 9	MACK 485-GB-3191, RENAULT, VOLVO & ON HWY TRUCKS				3.89	99	3.55	90
	4.25	108	10.31	262	<b>DBL7483</b>	FULL FLOW	99% @ 15	EXTENDED SERVICE MACK/VOLVO ENGINES				3.88	99	3.55	90
	4.25	108	10.31	262	<b>DBL7739</b>	FULL FLOW	99% @ 15	EXTENDED SERVICE CAT ENGINES				3.88	99	3.55	90
	4.25	108	10.32	262	<b>P551807</b>	FULL FLOW	99% @ 21	CATERPILLAR 1R1807, MACK 485GB3236				3.89	99	3.55	90
	4.23	107	5.79	147	<b>P559128</b>	FULL FLOW	99% @ 40	CAT 9N-6007				3.94	100	3.55	90
	4.33	110	6.38	162	<b>P550420</b>	FULL FLOW	50% @ 20	HITACHI 4296675				4.13	105	3.74	95
	4.33	110	6.73	171	<b>P502088</b>	FULL FLOW	50% @ 16	NISSAN 15201Z9000, 15201Z9002, 15201Z9003				3.90	99	3.46	88
	4.33	110	10.08	256	<b>P551102</b>	FULL FLOW	50% @ 20	DEUTZ 1174420	Yes	30-42	2.10-2.80	4.02	102	3.62	92
	4.33	110	10.20	260	<b>P550490</b>	FULL FLOW		SCANIA 1117285				4.09	104	3.66	93
	4.45	113	6.73	171	<b>P502083</b>	FULL FLOW	99% @ 48	MITSUBISHI 3743802400				2.93	74	2.54	65
1 3/8-16	4.29	109	10.36	263	<b>P550425</b>	BYPASS	99% @ 35	VOLVO 4775565				3.99	101	3.63	92
M20 x 1.5	4.13	105	3.15	80	<b>P550383</b>	FULL FLOW		ISUZU 8941145850				3.92	100	3.52	89
	4.20	107	4.98	126	<b>P550067</b>	FULL FLOW	50% @ 16	MITSUBISHI ME014833, ME004099				3.90	99	3.46	88
	4.24	108	5.62	143	<b>P551264</b>	FULL FLOW		KOMATSU/KOMATSU DRESSER Z14020F105		20	1.38	3.94	100	3.56	90
	4.33	110	6.38	162	<b>P551257</b>	FULL FLOW	99% @ 5	ISUZU X13201012				4.13	105	3.74	95



Thread	OD		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting		GSKT O.D.		GSKT I.D.	
	IN	MM	IN	MM						PSI	Bar	IN	MM	IN	MM
M24 x 1.5	4.13	105	4.81	122	<b>P550597</b>	COMBINATION		TOYOTA 9091503006, 9091530002				3.15	80	2.80	71
M26 x 1.5	4.21	107	5.90	150	<b>P502008</b>	COMBINATION	50% @ 20	mitsubishi ME013307, ME013343		11-17	0.80-1.00	2.87	73	2.19	56
M30 x 1.5	4.25	108	5.51	140	<b>P550707</b>	FULL FLOW	99% @ 48	TOYOTA 15601-68010	Yes	18-21	1.30-1.50	3.37	86	2.95	75
	4.23	107	6.61	168	<b>P559129</b>	FULL FLOW	99% @ 30	ROLLS ROYCE CV2473		18-21	1.30-1.50	4.05	103	3.42	87
M30 x 2	4.25	108	5.62	143	<b>P502222</b>	FULL FLOW	50% @ 16	FIAT 74741272	Yes			2.83	72	2.44	62
	4.27	108	9.00	229	<b>P550712</b>	FULL FLOW	99% @ 35	FIAT ALLIS 74744707		18-21	1.30-1.50	3.96	101	3.59	91
	4.29	109	9.06	230	<b>P550342</b>	FULL FLOW	50% @ 12	IVECO 1902102	Yes	36	2.48	4.06	103	3.62	92
	4.45	113	8.92	227	<b>P550639</b>	FULL FLOW	50% @ 14								
M32 x 1.5	4.25	108	8.77	223	<b>P502093</b>	COMBINATION	50% @ 20	CATERPILLAR 517950		25-31	1.80-2.20	4.02	102	3.62	92
<b>118 mm / 4.65" Diameter Family</b>															
1 1/2-12	4.65	118	6.22	158	<b>DBL7947</b>	FULL FLOW	99% @ 15	EXTENDED SERVICE DETROIT DIESEL ENGINES				4.31	109	3.84	98
	4.65	118	8.09	205	<b>P550596</b>	FULL FLOW	99% @ 25	HITACHI 4448336		20	1.40	4.33	110	3.85	98
	4.65	118	10.24	260	<b>P551670</b>	FULL FLOW	50% @ 14	CUMMINS 3313279, DET DIESEL ENG				4.32	110	3.85	98
	4.65	118	10.24	260	<b>DBL7670</b>	FULL FLOW	99% @ 15	EXTENDED SERVICE CUMMINS AND DETROIT DIESEL ENGINES				4.31	109	3.84	98
	4.65	118	10.24	260	<b>P167670</b>	FULL FLOW	99% @ 15	MERCEDES 23518524				4.31	109	3.84	98
	4.67	119	6.28	159	<b>P550947</b>	FULL FLOW	50% @ 14	GMC 25011106, DETROIT DIESEL ENGINES				4.32	110	3.85	98
	4.67	119	7.85	199	<b>P551381</b>	FULL FLOW	50% @ 20	HINO 15607-1381				4.32	110	3.85	98
	4.67	119	8.94	227	<b>P550671</b>	FULL FLOW	50% @ 14	CUMMINS				4.32	110	3.85	98
	4.86	123	5.87	149	<b>P550973</b>	COMBINATION	50% @ 20	ISUZU 8970492820, FULL FLOW BYPASS				4.32	110	3.85	98
	4.88	124	4.72	120	<b>P502042</b>	COMBINATION	50% @ 16	ISUZU 8970967770, 2906548000, 97148270		11-17	0.80-1.00	4.59	116	3.86	98
4.88	124	4.72	120	<b>P502046</b>	COMBINATION	50% @ 20	ISUZU 8970967770, 8943381811				4.59	116	3.86	98	
1 1/2-16	4.65	118	7.83	199	<b>P552050</b>	FULL FLOW	99% @ 39	HINO 156072050				4.32	110	3.85	98
	4.65	118	7.83	199	<b>P551441</b>	FULL FLOW	99% @ 21	HINO 156072190				4.09	104	3.86	98
	4.65	118	11.73	298	<b>DBL7405</b>	FULL FLOW	99% @ 15	EXTENDED SERVICE CAT ENGINES				4.32	110	3.85	98
	4.67	119	11.75	298	<b>P554105</b>	FULL FLOW	50% @ 20	4-5/8" DIA. VERSION OF CATERPILLAR #2P4005				4.32	110	3.85	98
1 1/8-16	4.50	114	8.50	216	<b>P550073</b>	FULL FLOW	50% @ 25	NISSAN 15208-Z9001				3.34	85	2.95	75
1 3/4-12	4.66	118	11.26	286	<b>P551145</b>	FULL FLOW	99% @ 20	NAVISTAR 1889124C91				4.33	110	3.86	98
1 3/8-16	4.66	118	9.91	252	<b>P550421</b>	FULL FLOW	99% @ 50	HITACHI 4266385, ISUZU 11324010521				4.33	110	3.85	98
	4.65	118	10.24	260	<b>P550777</b>	BYPASS	50% @ 14	CUMMINS 330432, 3313289				4.32	110	3.85	98
1 5/8-12	4.65	118	10.24	260	<b>DBL3998</b>	FULL FLOW	99% @ 15	EXTENDED SERVICE DETROIT DIESEL SERIES 60 ENGINES				4.31	109	3.84	98
	4.65	118	10.24	260	<b>P551016</b>	FULL FLOW	99% @ 15	DETROIT DIESEL SERIES 60 ENGINES				4.31	109	3.84	98
	4.65	118	10.24	260	<b>P552100</b>	FULL FLOW	99% @ 30	DET. DIESEL 50 & 60 SERIES ENGINES				4.32	110	3.85	98
	4.66	118	10.24	260	<b>P551146</b>	FULL FLOW	99% @ 20	NAVISTAR 1889119C91				4.33	110	3.86	98
2 1/4-12	4.65	118	8.94	227	<b>P553548</b>	COMBINATION	99% @ 15	CASE IH J919562				4.68	119	4.00	102
	4.65	118	11.70	297	<b>P553000</b>	COMBINATION	99% @ 22	CUMMINS ENGINES				4.68	119	4.00	102
	4.65	118	11.75	298	<b>DBL7300</b>	COMBINATION	99% @ 15	EXTENDED SERVICE CUMMINS ENGINES				4.68	119	4.00	102
M52 x 1.5	4.66	118	11.70	297	<b>P550595</b>	COMBINATION	99% @ 22	JOHN DEERE VENTURI COMBO				4.68	119	4.01	102
M90 x 2.0	4.79	122	11.85	301	<b>P554560</b>	FULL FLOW	99% @ 15	CUMMINS QSK ENGINES				4.68	118	3.85	98
M95 x 2.0	4.65	118	13.67	347	<b>P552025</b>	COMBINATION	99% @ 30	IH DT466 2004 ON				4.68	119	4.00	102



## Spin-On & Cartridge Filters

Thread	OD		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting		GSKT O.D.		GSKT I.D.	
	IN	MM	IN	MM						PSI	Bar	IN	MM	IN	MM
<b>118 mm / 4.65" Diameter Family, continued</b>															
M95 x 2.5	4.65	118	11.70	297	<b>DBL7900</b>	FULL FLOW	99% @ 15	EXTENDED SERVICE CUMMINS ISX				4.68	119	4.00	102
	4.65	118	11.70	297	<b>P550949</b>	FULL FLOW	99% @ 30	OEM EFFICIENCY CUMMINS ISX				4.68	119	4.00	102
	4.66	118	11.70	297	<b>P559000</b>	FULL FLOW	99% @ 22	HIGH EFFICIENCY CUMMINS ISX				4.68	119	4.00	102
	4.67	119	11.70	297	<b>DBL2501</b>	FULL FLOW	99% @ 15	EXTENDED SERVICE CUMMINS ISX				4.64	118	3.97	101

<b>136 mm / 5.36" Diameter Family</b>															
1 1/2-12	5.06	129	6.72	171	<b>P558329</b>	FULL FLOW	50% @ 25	JOHN DEERE AR98329							
1 1/2-16	5.00	127	6.85	174	<b>P553634</b>	FULL FLOW	50% @ 20	MICH FP, JOHN DEERE AR43634				5.05	128	4.71	120
	5.32	135	9.61	244	<b>P550788</b>	FULL FLOW	99% @ 21	CATERPILLAR C13 ENGINES				4.31	109	3.92	99
	5.33	135	12.13	308	<b>P551402</b>	FULL FLOW	50% @ 14	DD 2000 SERIES AND MARINE VERSION 4000 SERIES		31-38	2.20-2.70	4.31	109	3.92	100
	5.32	135	12.13	308	<b>P551808</b>	FULL FLOW	99% @ 21	CATERPILLAR 1R1808				4.31	109	3.92	100
	5.33	135	12.13	308	<b>P554005</b>	FULL FLOW	99% @ 39	CAT 1R-0716, 2P-4005, STGR, SULLAIR				4.31	109	3.92	100
	5.35	136	9.68	246	<b>P554206</b>	FULL FLOW	99% @ 40	IHC 684206C1				4.29	109	3.89	99
	5.55	141	12.20	310	<b>P550341</b>	FULL FLOW	50% @ 25	DAF 267714		32-40	2.20-2.80	4.37	111	3.94	100
1 1/8-16	5.56	141	6.00	152	<b>P550157</b>	FULL FLOW		FORD EDNN6714AA				4.37	111	3.97	101
13/16-16	5.44	138	5.44	138	<b>P550188</b>	FULL FLOW	99% @ 45	CUMMINS 170200		8-10	0.60-0.70				
M36 x 1.5	5.12	130	8.66	220	<b>P552562</b>	COMBINATION	99% @ 45	mitsubishi ME074013				4.21	107	3.86	98
	5.33	135	12.13	308	<b>DBL7367</b>	FULL FLOW		EXTENDED SERVICE NAVISTAR 1819452C1				4.29	109	3.89	99
	5.33	135	12.10	308	<b>P550512</b>	FULL FLOW	99% @ 21	DETROIT DIESEL 5241840301		31-38	2.14-2.62	4.31	109	3.92	100
	5.32	136	12.10	307	<b>P550367</b>	FULL FLOW	50% @ 14	NAVISTAR 1819452C1		26-30	1.80-2.10	4.35	110	3.95	100
M42 x 2	5.51	140	11.89	302	<b>P550452</b>	FULL FLOW		DAF 1310901, FLEETGUARD LF3737 & LF3773		36	2.48	4.37	111	3.97	101
M45 x 1.5	5.33	135	12.13	308	<b>P551400</b>	FULL FLOW	50% @ 14	DETROIT DIESEL 4000 SERIES ENGINE				4.31	109	3.92	100
M60 x 3	5.48	139	6.62	168	<b>P550356</b>	COMBINATION		FORD 826F6714		10-15	0.70-1.00				

## Cartridge Lube Filters

Outer Dia.		Inner Dia.		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application
IN	MM	IN	MM	IN	MM				
1.97	50	0.46	12	1.48	38	<b>P552421</b>	CARTRIDGE FULL FLOW		HONDA 15410-KF0-315, 15412-KF0-000
2.00	51	0.81	21	2.12	54	<b>P555400</b>	CARTRIDGE FULL FLOW		LISTER, PETTER
2.09	53	0.77	20	3.86	98	<b>P552361</b>	CARTRIDGE FULL FLOW		GMC 25177917
2.30	58	0.44	11	4.63	118	<b>P551294</b>	CARTRIDGE FULL FLOW		CASE IH 376373R91
2.36	60	0.63	16	3.94	100	<b>P550744</b>	CARTRIDGE		MERCEDES-BENZ A0002690321
2.35	60	0.70	18	3.90	99	<b>P550396</b>	CARTRIDGE FULL FLOW	50% @ 25	MERCEDES 001844901, 00184425
2.44	62	0.86	21	6.20	157	<b>P550521</b>	CARTRIDGE FULL FLOW		MERCEDES 1041800109
2.48	63	1.08	27	3.53	90	<b>P552419</b>	CARTRIDGE FULL FLOW		FORD DOHZ-3C602-B; INTERNATIONAL 507809-C91
2.50	64	1.22	31	4.53	115	<b>P550564</b>	CARTRIDGE FULL FLOW		MERCEDES 6111800009
2.50	64	1.22	31	5.91	150	<b>P550633</b>	CARTRIDGE		VOLVO 1521527 / M&H HU721
2.59	66	1.22	31	4.52	115	<b>P550798</b>	CARTRIDGE	99% @ 39	MERCEDES 0001802609
2.75	70	1.31	33	3.33	85	<b>P551291</b>	CARTRIDGE FULL FLOW		LEYLAND 134311
2.75	70	1.31	33	6.00	152	<b>P550183</b>	CARTRIDGE FULL FLOW	99% @ 36	FORD E1ADKN18662A
2.79	71	1.22	31	3.74	95	<b>P550797</b>	CARTRIDGE	99% @ 38	MERCEDES 6421800009
2.83	72	0.83	21	4.47	114	<b>P550184</b>	CARTRIDGE FULL FLOW	50% @ 20	FORD A730X6731TA
2.85	72	1.30	33	5.39	137	<b>P502193</b>	CARTRIDGE FULL FLOW	50% @ 20	ISUZU
2.85	72	1.30	33	5.39	137	<b>P550052</b>	CARTRIDGE FULL FLOW		MASSEY FERGUSON 101811M91, 1881840M1, 894976M91



## Cartridge Filters

Outer Dia.		Inner Dia.		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application
IN	MM	IN	MM	IN	MM				
2.87	73	0.93	24	4.02	102	<b>P505978</b>	CARTRIDGE		NISSAN 15208-2W200
2.90	74	1.12	28	5.53	140	<b>P552382</b>	CARTRIDGE FULL FLOW		INTERNATIONAL 406669-R1 406705-R91
2.97	75	1.07	27	5.64	143	<b>P551296</b>	CARTRIDGE FULL FLOW	99% @ 30	CASE IH A40902
2.98	76	0.78	20	4.07	103	<b>P551279</b>	CARTRIDGE FULL FLOW		CHRYSLER 1634447
3.03	77	1.02	26	8.19	208	<b>P550927</b>	CARTRIDGE FULL FLOW	99% @ 45	CATERPILLAR 9T-9054
3.11	79	0.75	19	9.37	238	<b>P550311</b>	CARTRIDGE FULL FLOW	50% @ 10	LEYLAND 602426
3.09	79	1.03	26	1.56	40	<b>P552402</b>	CARTRIDGE FULL FLOW		CASE A22279; INTERNATIONAL 133205-R91
3.11	79	1.38	35	9.04	230	<b>P550165</b>	CARTRIDGE FULL FLOW		CAT, LINK BELT 9F6742, LEROI
3.11	79	1.56	40	5.35	136	<b>P502203</b>	CARTRIDGE FULL FLOW	50% @ 20	NISSAN 1520876225
3.12	79	1.83	46	9.00	229	<b>P550816</b>	CARTRIDGE FULL FLOW	50% @ 20	CAT 4J-0816
3.22	82	1.50	38	7.89	200	<b>P550451</b>	CARTRIDGE		M.A.N. 51055040096
3.26	83	0.48	12	7.58	193	<b>P550181</b>	CARTRIDGE	99% @ 20	IHC 376375R91
3.27	83	0.83	21	5.16	131	<b>P550767</b>	CARTRIDGE FULL FLOW		MERCEDES OM SERIES ENGINES
3.27	83	0.83	21	7.60	193	<b>P550764</b>	CARTRIDGE FULL FLOW		MERCEDES, M.A.N., CLAAS
3.27	83	0.94	24	5.12	130	<b>P550766</b>	CARTRIDGE FULL FLOW		MERCEDES 3661840225
3.24	83	1.41	36	6.65	169	<b>P550563</b>	CARTRIDGE FULL FLOW		MERCEDES 6061840125
3.27	83	1.49	38	6.36	161	<b>P552422</b>	CARTRIDGE FULL FLOW		BMW 11421745390 11421745391
3.27	83	1.59	40	5.80	147	<b>P550768</b>	CARTRIDGE FULL FLOW	99% @ 40	MERCEDES 0001801609
3.27	83	2.00	51	8.24	209	<b>P550761</b>	CARTRIDGE FULL FLOW	50% @ 15	MERCEDES 0001801709
3.26	83	2.20	56	7.59	193	<b>P550763</b>	CARTRIDGE FULL FLOW		METAL FREE LUBE
3.27	83			5.39	137	<b>P550766</b>	CARTRIDGE FULL FLOW		MERCEDES, DEMAG, LIEBHERR, O&K, RVI, CLAAS
3.25	83			7.13	181	<b>P550528</b>	CARTRIDGE FULL FLOW	99% @ 25	FORD 3C3Z6731AA F SERIES PICKUP
3.31	84	0.65	17	5.63	143	<b>P550015</b>	CARTRIDGE FULL FLOW	50% @ 16	ISUZU 9885111940
3.31	84	0.75	19	4.21	107	<b>P550220</b>	CARTRIDGE FULL FLOW		SCANIA 1329876, 1381235
3.30	84	0.93	24	7.50	190	<b>P550315</b>	CARTRIDGE FULL FLOW		MERCEDES 3661800009
3.35	85	1.57	40	5.63	143	<b>P502194</b>	CARTRIDGE FULL FLOW	50% @ 16	ISUZU 13240085,
3.34	85	1.62	41	6.50	165	<b>P555088</b>	CARTRIDGE FULL FLOW	99% @ 38	JOHN DEERE AT15088T, PURO R14
3.37	86	1.13	29	4.25	108	<b>P552465</b>	CARTRIDGE		JOHN DEERE AH1081R
3.47	88	0.43	11	7.61	193	<b>P552471</b>	CARTRIDGE FULL FLOW		MERCEDES-BENZ 6171840025, 6171840125
3.52	89	0.69	18	4.16	106	<b>P550179</b>	CARTRIDGE	50% @ 10	CASE 08152AB
3.47	89	0.94	24	5.53	141	<b>P550186</b>	CARTRIDGE	99% @ 20	IHC 355009R91
3.50	89	1.34	34	3.78	96	<b>P551285</b>	CARTRIDGE FULL FLOW		PERKINS 101606
3.56	90	1.28	33	5.69	145	<b>P550141</b>	CARTRIDGE FULL FLOW	50% @ 20	JOY, GMC 5576054, 5574540
3.54	90	1.92	49	4.09	104	<b>P502202</b>	CARTRIDGE FULL FLOW	50% @ 20	ISUZU 1878103720
3.58	91	0.47	12	6.42	163	<b>P550361</b>	CARTRIDGE COMBINATION		MERCEDES 6011800009
3.59	91	1.28	33	6.37	162	<b>P552415</b>	CARTRIDGE FULL FLOW		GMC 5573976
3.62	92	0.51	13	5.83	148	<b>P550359</b>	CARTRIDGE FULL FLOW		ROLLS ROYCE OE12448
3.62	92	0.69	18	4.33	110	<b>P502179</b>	CARTRIDGE FULL FLOW	50% @ 20	MITSUBISHI 3134012030
3.62	92	0.69	18	6.30	160	<b>P502180</b>	CARTRIDGE FULL FLOW	50% @ 20	MITSUBISHI 3144012030
3.63	92	1.31	33	7.88	200	<b>P552375</b>	CARTRIDGE SOCK		OLIVER 156149AS; WAUKESHA 493009; WHITE 872946
3.75	95	1.04	26	5.94	151	<b>P550092</b>	CARTRIDGE FULL FLOW	99% @ 25	AC, CASE, CAT, CLARK, FTGD LF503
3.74	95	1.91	49	7.05	179	<b>P502225</b>	CARTRIDGE FULL FLOW	50% @ 16	LEYLAND 11K243
3.78	96	1.10	28	5.96	151	<b>P552458</b>	CARTRIDGE FULL FLOW		CASE D45378, G33058, A60524, A61234
3.78	96	1.10	28	6.09	155	<b>P552455</b>	CARTRIDGE FULL FLOW		CASE D45378, G33058, A60524, A61234
3.82	97	1.35	34	4.41	112	<b>P550185</b>	CARTRIDGE FULL FLOW	50% @ 20	MASSEY FERGUSON 1852331M1
3.82	97	1.73	44	5.74	146	<b>P550076</b>	CARTRIDGE		NISSAN 15274-99428
3.82	97			5.80	147	<b>P574862</b>	CARTRIDGE		MERCEDES 900 SERIES ENGINES
3.83	97			5.80	147	<b>P574863</b>	CARTRIDGE		NAVISTAR MAXXFORCE ENGINES



## Cartridge Filters

Outer Dia.		Inner Dia.		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application
IN	MM	IN	MM	IN	MM				
<b>Cartridge Lube Filters</b>									
3.87	98	0.49	13	4.58	116	<b>P550287</b>	CARTRIDGE		MACK 57GC2187
3.87	98	0.64	16	4.58	116	<b>P550286</b>	CARTRIDGE FULL FLOW		MACK 57GC2134
3.84	98	7.00	178			<b>P552206</b>	CARTRIDGE		MACK ASET
3.91	99	0.57	15	4.37	111	<b>P550203</b>	CARTRIDGE FULL FLOW	99% @ 20	FIAT ALLIS, CASE, CLARK, MF, HYSTER, GALION
3.89	99	0.66	17	5.67	144	<b>P550074</b>	CARTRIDGE		NISSAN 15274-Z9029
3.93	100	0.87	22	4.81	122	<b>P551475</b>	CARTRIDGE FULL FLOW	99% @ 40	CASE A21475, ALLIS CHALMERS
3.94	100	1.56	40	7.19	183	<b>P502206</b>	CARTRIDGE FULL FLOW	50% @ 16	NISSAN 1527499128
3.94	100	1.73	44	7.24	184	<b>P550077</b>	CARTRIDGE FULL FLOW	50% @ 16	NISSAN 15274-90225
3.98	101	0.65	17	7.68	195	<b>P550070</b>	CARTRIDGE FULL FLOW	50% @ 25	MITSUBISHI ME034481
3.98	101	1.10	28	9.25	235	<b>P550068</b>	CARTRIDGE FULL FLOW	50% @ 25	MITSUBISHI ME021254
3.97	101	1.20	30	9.21	234	<b>P502183</b>	CARTRIDGE FULL FLOW		MITSUBISHI ME021073
3.98	101	1.27	32	2.78	71	<b>P551761</b>	CARTRIDGE FULL FLOW		CASE 902125
3.98	101	1.63	41	9.29	236	<b>P550484</b>	CARTRIDGE FULL FLOW	50% @ 20	CAT 1R-0659, 4W-4840, KOMATSU 6610-53-5120
4.00	102	0.56	14	5.00	127	<b>P550170</b>	CARTRIDGE		FRAM F4
4.00	102	0.56	14	5.00	127	<b>P550171</b>	CARTRIDGE		FRAM F21
4.02	102	0.55	14	8.00	203	<b>P550117</b>	CARTRIDGE	99% @ 20	CLARK EUCLID GMC 5572425 (MILITARY SEN.)
4.03	102	0.66	17	4.67	119	<b>P551277</b>	CARTRIDGE		DELUXE WD30
4.02	102	1.76	45	9.92	252	<b>P550629</b>	CARTRIDGE		SCANIA 164 SERIE, SCANIA MARINE ENGINES DI SERIES
4.06	103	1.62	41	5.50	140	<b>P553335</b>	CARTRIDGE FULL FLOW	99% @ 40	IHC, GALION, HOUGH, TOWMOTOR
4.06	103			5.73	146	<b>P550952</b>	CARTRIDGE	50% @ 17	MANN & HUMMEL ZR905Z, DAF 1643072
4.09	104	0.59	15	5.67	144	<b>P550062</b>	CARTRIDGE FULL FLOW	50% @ 16	HITACHI 4507886
4.10	104	0.59	15	9.13	232	<b>P550059</b>	CARTRIDGE FULL FLOW	50% @ 16	HITACHI 4505384
4.09	104	1.26	32	6.69	170	<b>P550080</b>	CARTRIDGE FULL FLOW	50% @ 16	HINO 6071-2104-40
4.09	104	1.26	32	7.09	180	<b>P550379</b>	CARTRIDGE FULL FLOW	50% @ 25	HINO 156071560
4.09	104	1.92	49	6.30	160	<b>P550010</b>	CARTRIDGE FULL FLOW	50% @ 20	HINO 15607-1090
4.17	106	0.59	15	4.17	106	<b>P550017</b>	CARTRIDGE FULL FLOW	50% @ 25	ISUZU 9885132630
4.17	106	0.59	15	7.30	185	<b>P550018</b>	CARTRIDGE FULL FLOW	50% @ 16	ISUZU 9885132641
4.25	108	1.25	32	16.38	416	<b>P552427</b>	CARTRIDGE SOCK		WINSLOW W1645T
4.30	109	1.45	37	8.90	226	<b>P550132</b>	CARTRIDGE FULL FLOW	99% @ 30	DET. DIESEL ENG W/CARTRIDGE LUBE
4.29	109	7.44	189			<b>P552231</b>	CARTRIDGE		MACK E7
4.33	110	0.75	19	7.56	192	<b>P550378</b>	CARTRIDGE FULL FLOW	50% @ 25	MITSUBISHI ME034605
4.33	110	2.04	52	8.11	206	<b>P502205</b>	CARTRIDGE FULL FLOW	50% @ 16	NISSAN 1527499025
4.38	111	1.44	37	5.75	146	<b>P550147</b>	CARTRIDGE SOCK	99% @ 40	GMC 5574978
4.38	111	1.59	40	31.00	787	<b>P550614</b>	CARTRIDGE	95% @ 15	WAUKESHA 168660
4.37	111	3.62	92	9.56	243	<b>P552469</b>	CARTRIDGE FULL FLOW		JOHN DEERE AT45422
4.41	112	2.22	56	5.91	150	<b>P550630</b>	CARTRIDGE FULL FLOW		DAF 75CF, DAF 85CF, DAF 95 XF
4.44	113	2.31	59	8.66	220	<b>P550812</b>	CARTRIDGE	99% @ 38	ENERGETICS, DIRECT BONDING, DAF 1643070
4.44	113	2.67	68	8.66	220	<b>P550661</b>	CARTRIDGE		DAF 85CF AND XF95
4.50	114	1.45	37	16.00	406	<b>P552428</b>	CARTRIDGE SOCK		WAUKESHA 167602B
4.47	114	1.75	44	9.06	230	<b>P558462</b>	CARTRIDGE FULL FLOW		IHC 268462R91, CUMMINS 104428
4.48	114	2.84	72	10.83	275	<b>P502184</b>	CARTRIDGE FULL FLOW	50% @ 16	MITSUBISHI 68937310012
4.53	115	2.24	57	7.68	195	<b>P554925</b>	CARTRIDGE FULL FLOW		M.A.N. 81.05504.0025
4.57	116	2.12	54	12.68	322	<b>P550071</b>	CARTRIDGE FULL FLOW	50% @ 25	MITSUBISHI ME064289
4.59	117	0.75	19	4.87	124	<b>P551014</b>	CARTRIDGE FULL FLOW		FORD C5TE6744A
4.59	117	2.25	57	7.00	178	<b>P550174</b>	CARTRIDGE FULL FLOW	99% @ 18	IHC 213445R91





Outer Dia.		Inner Dia.		Length		Part No.	Part Description	Efficiency @ Micron	Primary Application
IN	MM	IN	MM	IN	MM				
4.64	118	1.78	45	11.77	299	<b>P550453</b>	CARTRIDGE		MERCEDES A5411840225
4.70	119	2.16	55	7.60	193	<b>P558425</b>	CARTRIDGE FULL FLOW		MERCEDES 4011840025
4.75	121	2.09	53	10.35	263	<b>P551005</b>	CARTRIDGE	50% @ 17	DETROIT A4721800109 (DD15)
4.76	121	1.50	38	7.44	189	<b>P550613</b>	CARTRIDGE FULL FLOW	99% @ 48	CUMMINS 173174
4.76	121	2.20	56	5.67	144	<b>P550765</b>	CARTRIDGE FULL FLOW		M.A.N. 51.05504.0098
4.76	121	2.20	56	9.60	244	<b>P550041</b>	CARTRIDGE FULL FLOW	50% @ 20	MERCEDES BENZ 001 1843825, M.A.N.
4.76	121	2.24	57	9.76	248	<b>P550769</b>	CARTRIDGE FULL FLOW	99% @ 30	MERCEDES 0001802109
4.76	121	2.24	57	8.05	205	<b>P551108</b>	CARTRIDGE	99% @ 25	NAVISTAR 3006874C91, MAXX FORCE ENGINES 2007-2009
4.80	122	0.67	17	8.62	219	<b>P502190</b>	CARTRIDGE FULL FLOW	50% @ 5	HINO 15607-1351
4.81	122	0.66	17	8.86	225	<b>P550058</b>	CARTRIDGE		HINO 156071010
4.80	122	0.67	17	9.80	249	<b>P502191</b>	CARTRIDGE FULL FLOW	50% @ 5	HINO 156071341, 15607-1340
4.84	123	0.79	20	5.43	138	<b>P502186</b>	CARTRIDGE FULL FLOW	50% @ 20	TOYOTA
4.84	123	2.25	57	8.86	225	<b>P553925</b>	CARTRIDGE FULL FLOW	99% @ 36	MERCEDES BENZ 0011843925
5.06	127	0.07	2	12.13	305	<b>P552377</b>	CARTRIDGE FULL FLOW		NUGENT LUBE BAG REPLACEMENT CARTRIDGE
5.00	127	0.69	18	7.88	200	<b>P551781</b>	CARTRIDGE		WAUKESHA 73759B
5.00	127	0.77	19	8.22	209	<b>P552462</b>	CARTRIDGE FULL FLOW		Ford B8C-6731-A
5.00	127	1.50	38	9.62	244	<b>P550516</b>	CARTRIDGE FULL FLOW	50% @ 20	CUMMINS 158139
5.04	128	0.61	15	6.30	160	<b>P550021</b>	CARTRIDGE FULL FLOW	50% @ 25	NISSAN 15274-99329
5.04	128	0.79	20	7.91	201	<b>P550380</b>	CARTRIDGE FULL FLOW	50% @ 25	ISUZU 1878103141
5.04	128	2.22	56	9.10	231	<b>P550087</b>	CARTRIDGE FULL FLOW		KOMATSU 6610-50-5100
5.02	128	2.26	57	5.59	142	<b>P550066</b>	CARTRIDGE FULL FLOW	50% @ 20	MITSUBISHI 31240-53054
5.06	129	2.94	75	9.00	229	<b>P552380</b>	CARTRIDGE FULL FLOW		INTERNATIONAL 623017-C1
5.07	129	3.34	85	9.00	229	<b>P166481</b>	CARTRIDGE FULL FLOW	99% @ 22	CAT 5S-0485
5.08	129	3.37	86	8.94	227	<b>P550485</b>	CARTRIDGE FULL FLOW	50% @ 14	CAT 1R-0721, 5S-0485, HYSTER 75669
5.12	130	0.59	15	9.17	233	<b>P550034</b>	CARTRIDGE FULL FLOW	50% @ 5	NISSAN 15274-99227
5.12	130	0.59	15	11.79	299	<b>P550065</b>	CARTRIDGE KIT	99% @ 48	MITSUBISHI ME064356
5.51	140	1.34	34	7.60	193	<b>P502200</b>	CARTRIDGE FULL FLOW	50% @ 20	ISUZU 1132401170
6.01	153	3.50	89	14.50	368	<b>P551336</b>	CARTRIDGE FULL FLOW	50% @ 25	FLEETLIFE FP614-40
6.30	160	0.28	7	5.20	132	<b>P551345</b>	CARTRIDGE	50% @ 5	HITACHI 4231195
6.30	160	0.67	17	10.51	267	<b>P550423</b>	CARTRIDGE		HITACHI 4225367
6.50	165	1.47	37	29.38	746	<b>P550636</b>	CARTRIDGE	99% @ 35	P22 RR & MARINE
6.50	165	1.69	43	7.56	192	<b>P551344</b>	CARTRIDGE		HITACHI 4208241
6.50	165	6.50	165	13.00	330	<b>P550381</b>	CARTRIDGE		ISUZU 1878100501
6.50	165	11.02	280	11.02	280	<b>P550382</b>	CARTRIDGE		ISUZU 1878102390
6.50	165	11.02	280	12.95	329	<b>P550384</b>	CARTRIDGE	50% @ 5	ISUZU 1132400560
6.50	165	3/8-24		8.75	222	<b>P552041</b>	CARTRIDGE		ISUZU/GMC CAB FORWARD HOUSING
6.75	171	2.47	63	17.75	451	<b>P552414</b>	CARTRIDGE SOCK		WHITE 673374
7.42	188	2.63	67	10.00	254	<b>P557500</b>	CARTRIDGE FULL FLOW	50% @ 20	CAT 7N-7500
7.42	188	3.43	87	13.38	340	<b>P554136</b>	CARTRIDGE FULL FLOW	50% @ 20	CAT 1W-4136
7.64	194	4.65	118	6.71	170	<b>P502223</b>	CARTRIDGE FULL FLOW	50% @ 20	MANN H20211
7.72	196	0.86	22	10.06	256	<b>P550500</b>	CARTRIDGE	50% @ 5	500 SERIES BYPASS
7.72	196	0.86	22	15.06	383	<b>P550750</b>	CARTRIDGE	50% @ 5	750 SERIES CARTRIDGE BYPASS
7.72	196	0.86	22	15.06	383	<b>P550751</b>	CARTRIDGE	50% @ 5	750 SERIES PREMIUM BYPASS
7.87	200	0.86	22	10.03	255	<b>P550493</b>	CARTRIDGE		CUMMINS 106621



## Lube Filtration

### Lube Filters for Cummins® ISX Engines



## Full-Flow Lube Filters for Cummins® ISX Engines

Every oil filter needs to effectively balance three characteristics: efficiency (contaminant removal), capacity (contamination holding ability) and restriction (resistance to oil flow). Donaldson full-flow lube filters process the entire regulated oil flow through our pleated elements, even in cold temperatures – meaning your engine receives critical lubrication protection. Two-stage stacked disc filters allow only a portion of the flow to pass through the high-efficiency stage – which means more contaminant can pass on to the engine.

That's precisely why Donaldson recommends full-flow lube filters that strike the right balance for Cummins ISX and other heavy-duty engines. Donaldson filters deliver:

- Ultra-high efficiency on fine particulate and oil degradation (sludge),
- Higher contaminant holding capacity, and
- Minimum oil flow restriction.

Donaldson offers three different lube filters for ISX engines that keep oil cleaner by capturing more contaminants that can cause engine wear. Choose the filter that best fits your requirements.

### OEM Efficiency

### High Efficiency

#### STANDARD SEALS

#### HEAVY-DUTY SEALS



## P550949

### OEM Efficiency

Reliable contaminant capture and capacity (life). If you've experienced filter plugging due to excessive sludge caused by soot or coolant contamination – this is the filter for you.

- Efficiency: >99% @ 30µm
- 35% lower oil flow restriction than LF9080

#### CROSSESTO:

**Cummins 2882674 / Fleetguard LF9080**

Tested per ISO 4548/12 and ISO 3968.



## P559000

### High Efficiency

Increased levels of contamination capture combined with good capacity. Offers a higher level of engine protection than the OEM standard option.

- Efficiency: 99% @ 15µm
- 13% lower oil flow restriction than LF9080



## DBL7900

(ELF7900)

### High Efficiency with Heavy-Duty, Long-Life Seals

If your primary concern is engine protection – this premium filter will deliver with durable seals and heavy-duty potting materials to withstand extreme conditions and hot oil temperatures.

- Efficiency: 99% @ 15µm
- 40% lower oil flow restriction than LF9031

**Cummins 4906633 / Fleetguard LF9031**

Cummins® is a registered trademark of Cummins, Inc.

See brochure F113026 for further performance information.

[www.donaldson.com/en/engine/support/datalibrary/084768.pdf](http://www.donaldson.com/en/engine/support/datalibrary/084768.pdf)