Lube Filtration

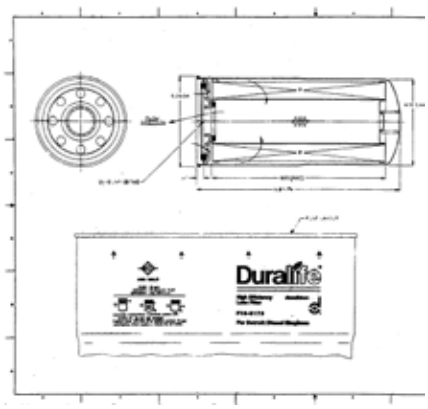
Donaldson FILTRATION SOLUTIONS

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.

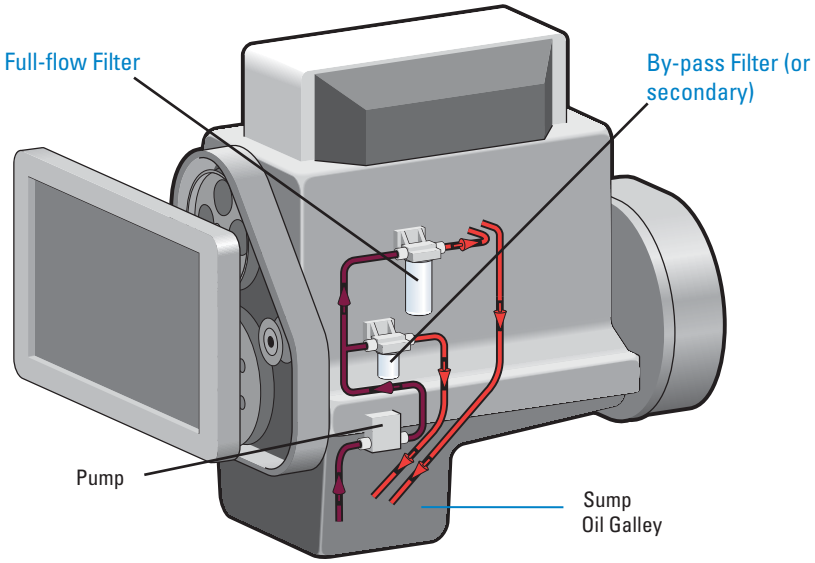
By-pass (Secondary) Filtration

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.

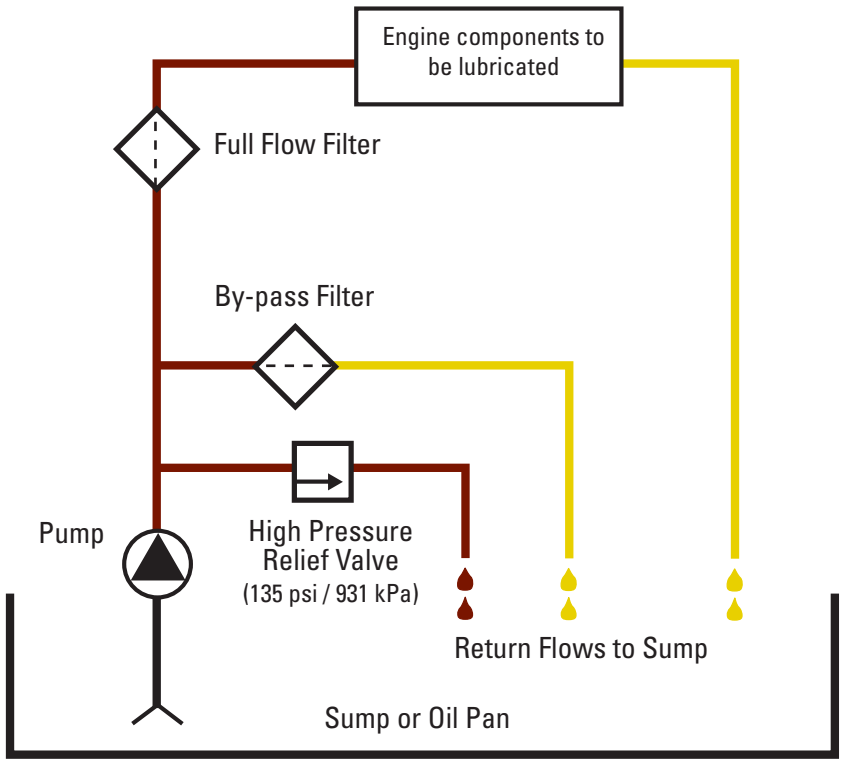
Two-stage Filtration

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



Lube Filtration
Overview

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.

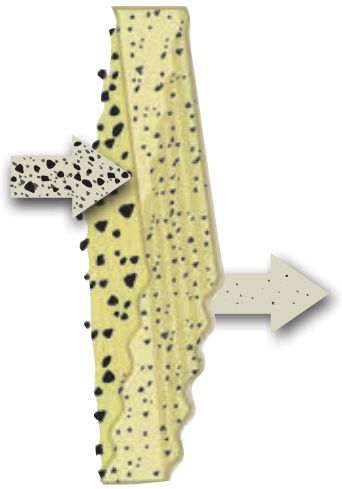
New lube media types are constantly under evaluation in our internal laboratories and in controlled field testing. If you have a specific application requirement, please contact Donaldson to see if there are additional media option to better suit your application.

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



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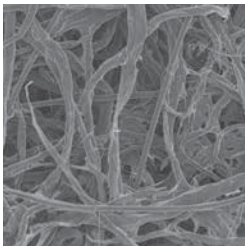

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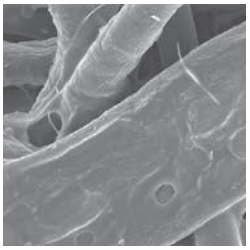


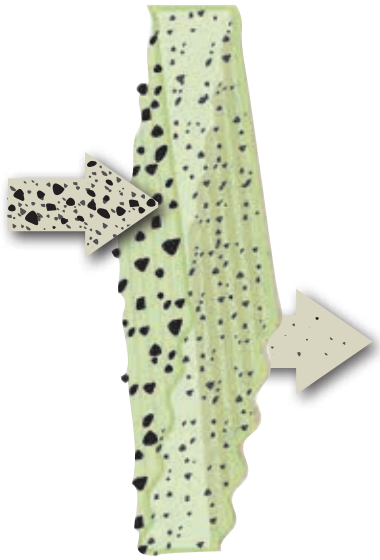
Media Image

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.

How it Works



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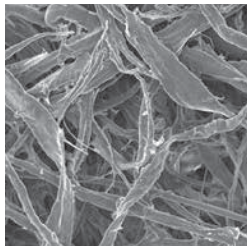

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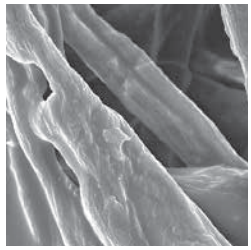
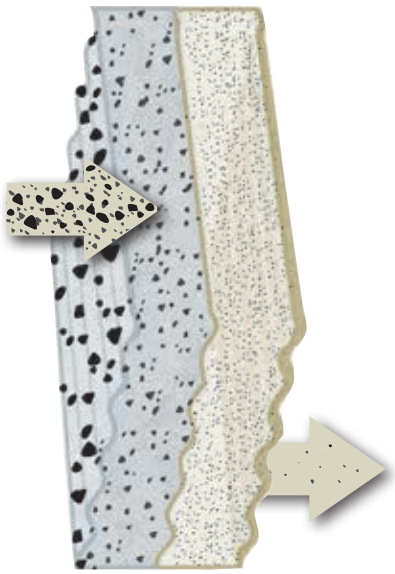


Media Image

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.

How it Works



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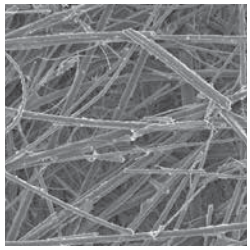

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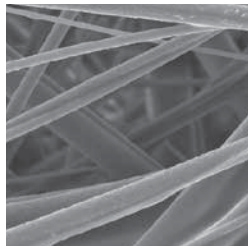


Media Image

Synteq™

Lube Filtration
Overview

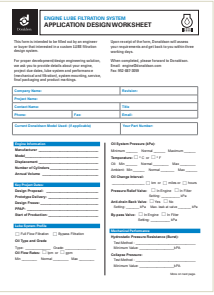
Lube System Profile

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.


ENGINE LUBE FILTRATION SYSTEM
APPLICATION 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 a 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 than 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
DBL3998	P552100	LF9620	B495MPG	LFP2160XL	51971XD	Detroit Diesel Series 60 Engines
DBL7300	P553000	LF9039	BD7309	LFP3000XL	51748XD	Cummins® Engines
DBL7345	P558616	LF3805	—	—	—	Cummins® 4B 3.9 Series Lube
DBL7349	P558615	LF9028	BT7349	LFP780XL	57620XE	Cummins® 4B and 6.B Series Lube
DBL7367	P550367	LF9026	—	LFP2285XL	—	Navistar Engines
DBL7405	P554005	LF9691	B7249MPG	LFP4005XL	51792XD	Caterpillar Engines
DBL7483	P553191 / P550519	LF9667	—	LFP3191XL	—	Mack/Volvo Engines
DBL7670	P551670	LF9325	B96MPG	LFP670XL	51970XD	Cummins® Engines/ Detriot Desiel Engines
DBL7690	P550769	LF16046	—	—	57213	Mercedes Engines
DBL7739	P554004	LF3379	B76MPG	LFP3191	51791XE	Caterpillar Equipment
DBL7900	P559000	LF9031	—	—	57746XD	Cummins® ISK Engines and ISM Engines
DBL7947	P550947	LF3363SC	—	—	—	Detriot Desiel 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.

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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

Donaldson FILTRATION SOLUTIONS

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)	♦

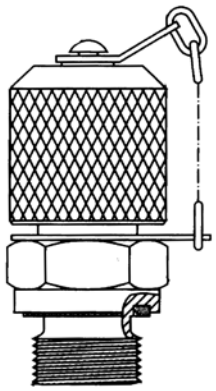
Sampling Accessories

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

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.

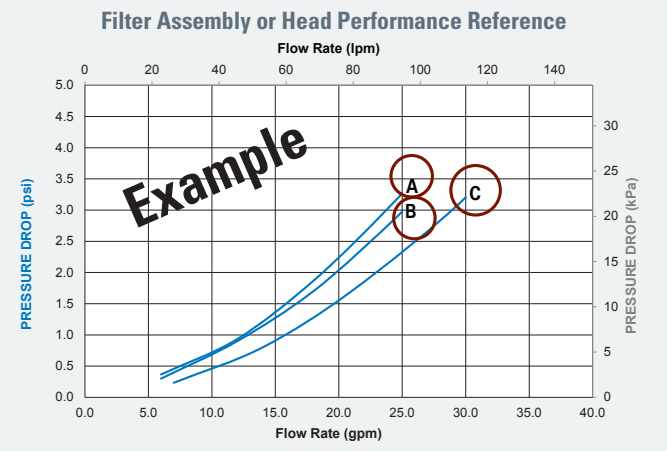
Filter Performance Choices

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 ϕ	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

Donaldson FILTRATION SOLUTIONS

Flow Range: up to 1.75 gpm / 6.62 lpm

Operating Pressure

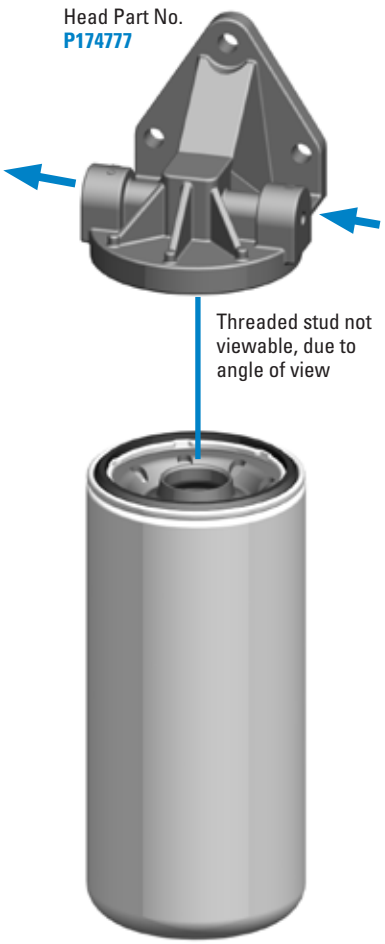
Up to 150 psi (1034 kPa)

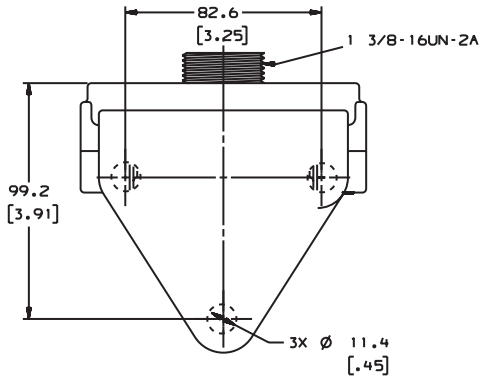
Flow Rate

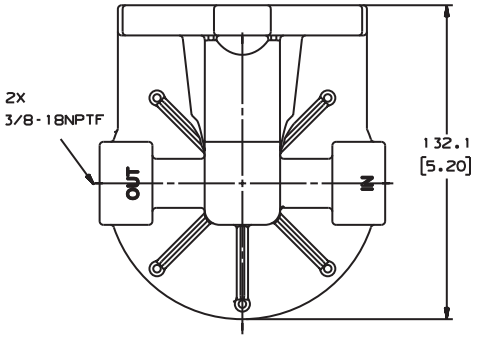
1.75 gpm / 6.62 lpm @ 85 PSI

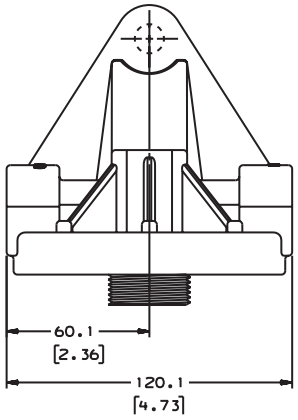
Oil Compatibility

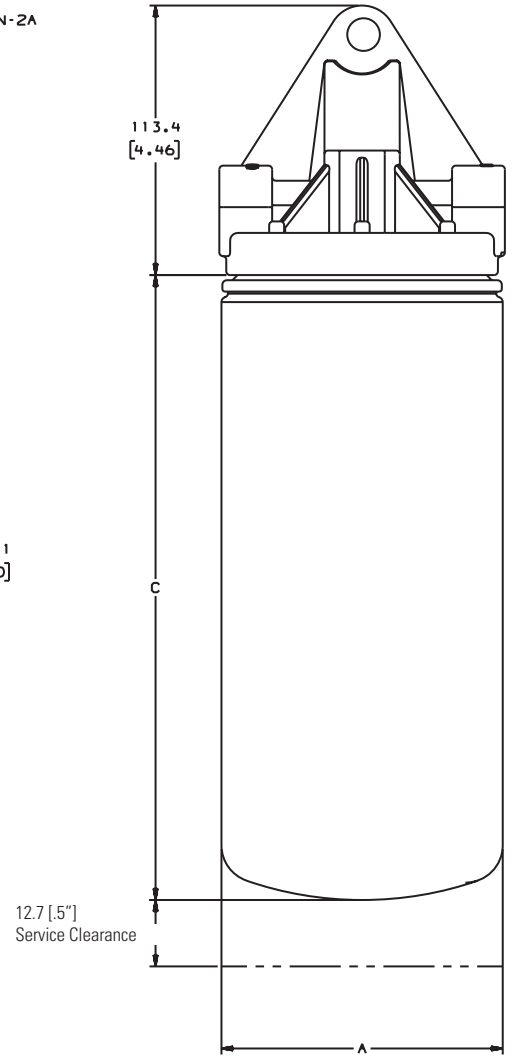
Compatible with petroleum based fluids (hydrocarbon) and up to 20% biodiesel







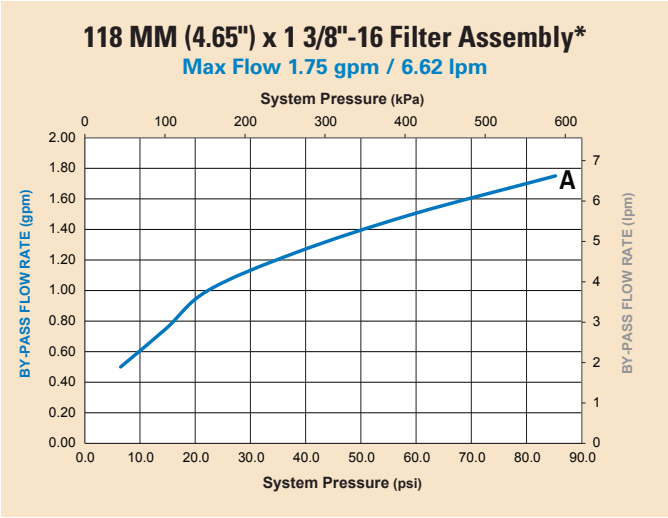


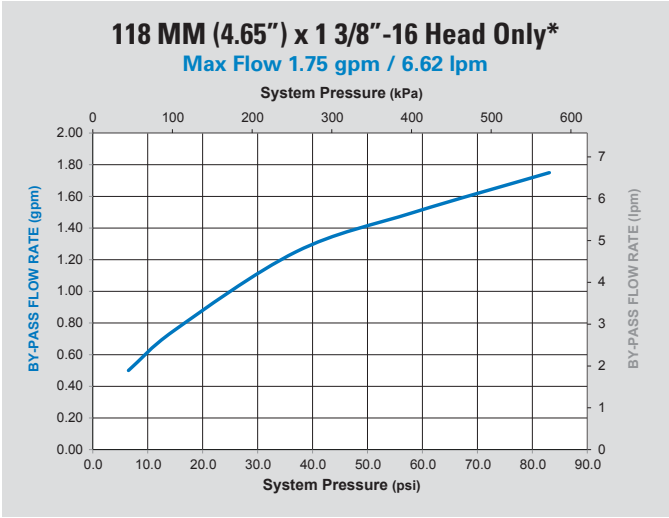


Filter Selection Chart

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	P550777	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)

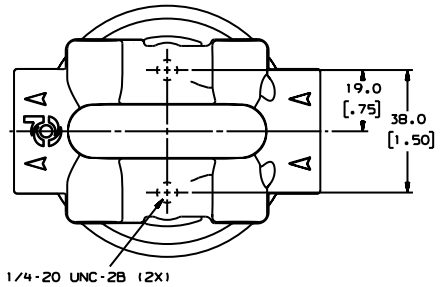
Flow Rate

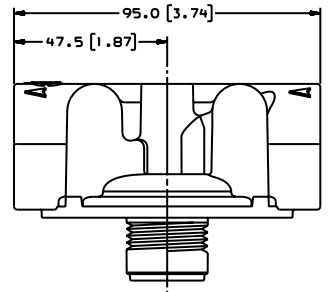
Up to 20 gpm / 76 lpm

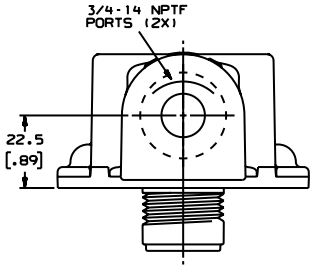
Oil Compatibility

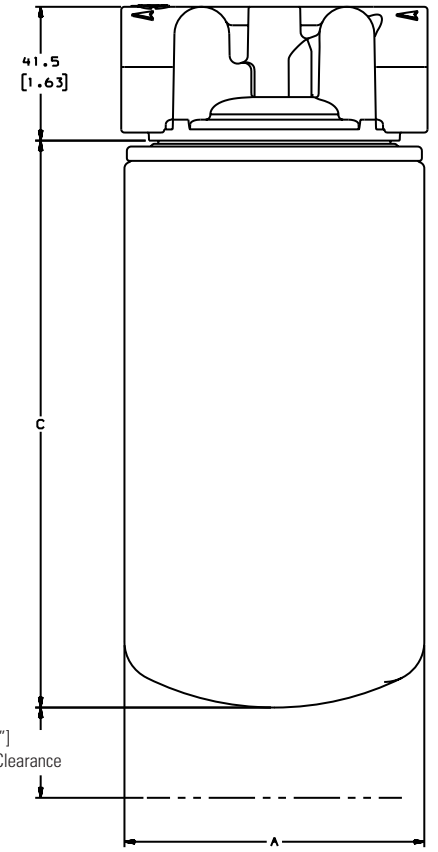
Compatible with petroleum based fluids (hydrocarbon) and up to 20% biodiesel

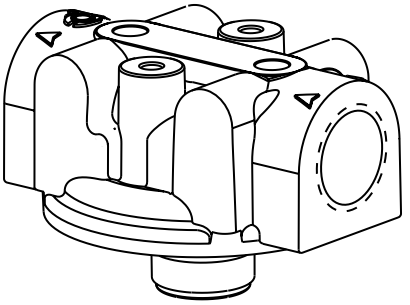
Head Part No.
P561134







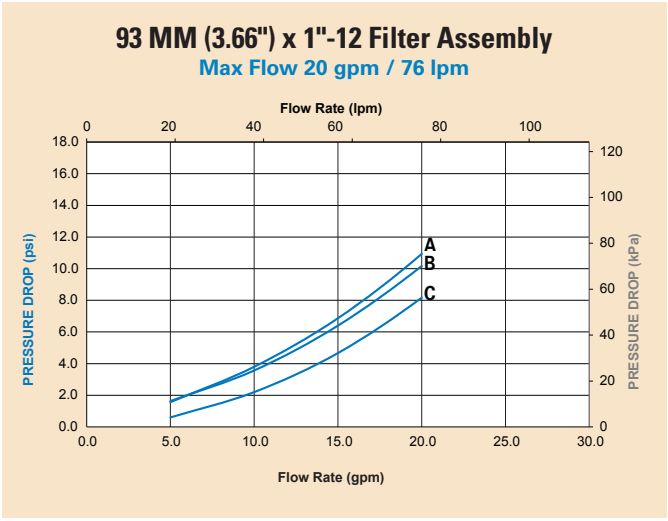


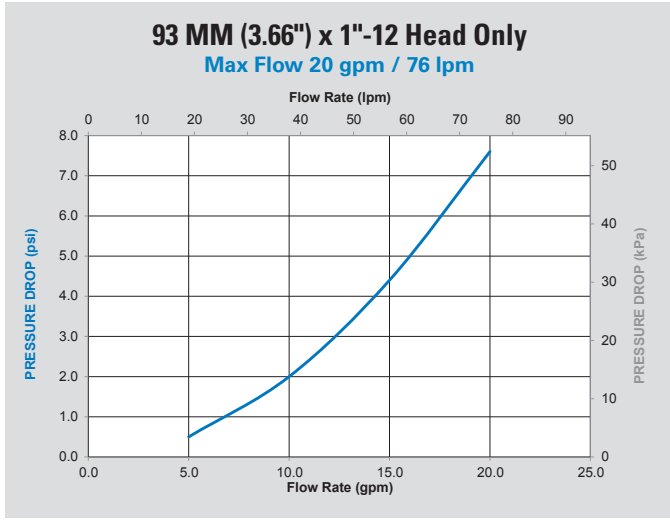


Filter Selection Chart

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	P552819	B	Yes	18-23	1.30-1.60	No	2.83	72	2.42	61
				Cellulose		P555680	C		18-23	1.30-1.60	No				
		6.85	174	Cellulose		P553712	C				No				
				Cellulose		P555616	A	Yes			Yes				
				Cellulose		P557207	C		7-10	0.50 -0.70	No				
		7.87	200	Cellulose		P553771	A	Yes	35	2.41	No				
3.74	95	5.35	136	Cellulose		P559418	B	Yes	36	2.48	No				
3.81	97	6.85	174	Cellulose		P558250	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

Donaldson FILTRATION SOLUTIONS

Flow Range: up to 45 gpm / 170 lpm

Operating Pressure

Up to 150 psi (1034 kPa)

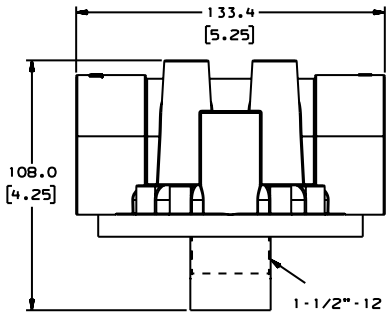
Flow Rate

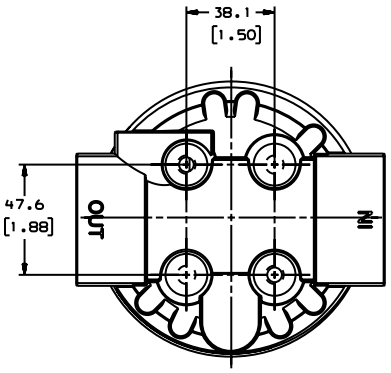
Up to 45 gpm / 170 lpm

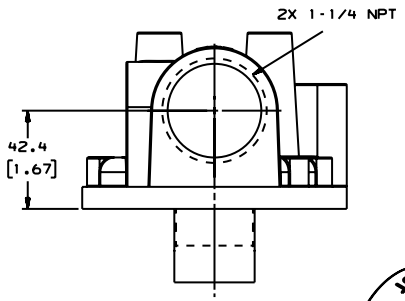
Oil Compatibility

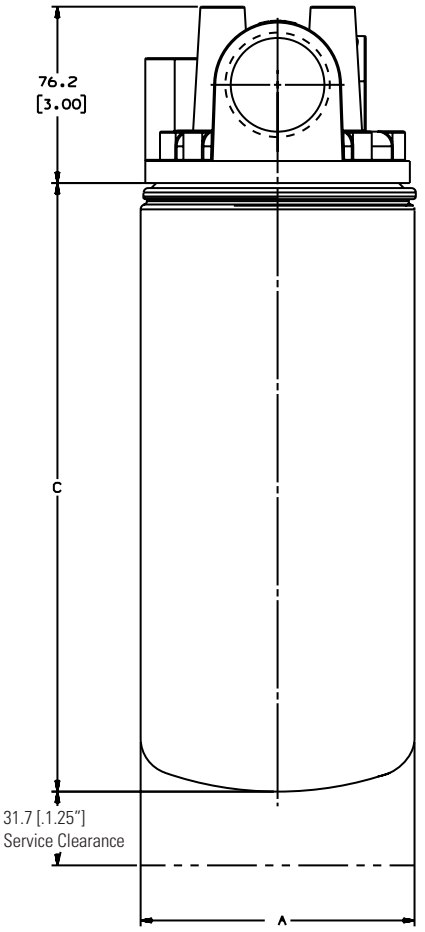
Compatible with petroleum based fluids (hydrocarbon) and up to 20% biodiesel

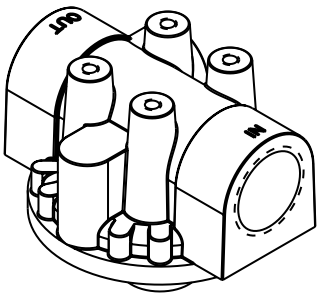
Head Part No.
P174780









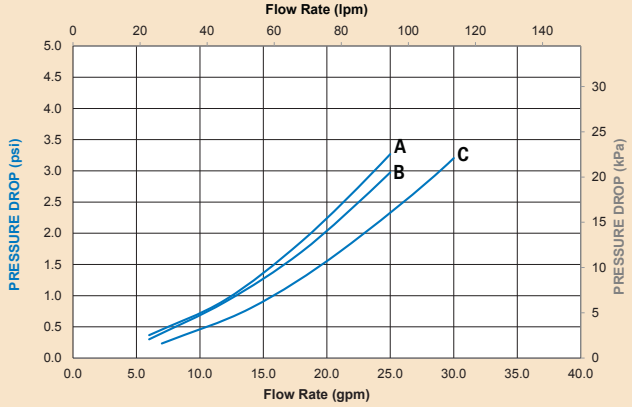


Filter Selection Chart

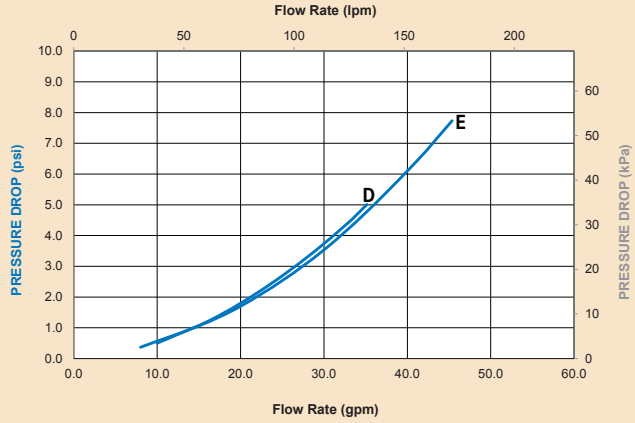
Max. Recommended Flow Rate		Outer Diameter		(C) Filter Length		Media Type	Efficiency @ Micron	Part Number	Performance Curve	Gasket Outer Diameter		Gasket Inner Diameter	
gph	lph	in	mm	in	mm					in	mm	in	mm
25	95	4.65	118	6.22	158	Cellulose	99% @ 23	P550947	A	4.32	110	3.85	98
						Synteq	99% @ 16	DBL7947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

Performance Curves

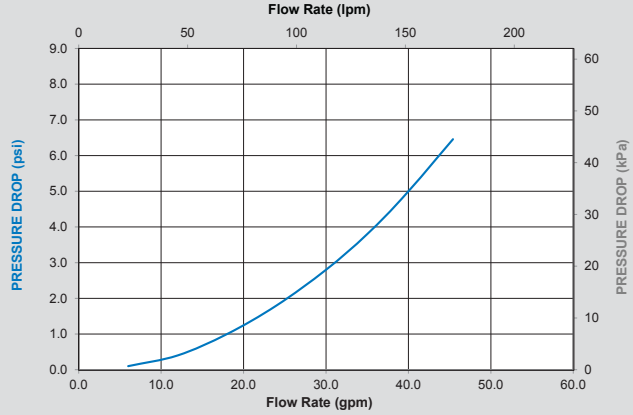
118 MM (4.65") x 1 1/2"-12 Filter Assembly
Max Flow 25-30 gpm / 95-114 lpm



118 MM (4.65") x 1 1/2"-12 Filter Assembly
Max Flow 35-45 gpm / 132-170 lpm



118 MM (4.65") x 1 1/2"-12 Head Only
Max Flow 45 gpm / 170 lpm



Spin-On Filters

Thread	OD IN	OD MM	Length IN	Length MM	Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting PSI	By-Pass Valve Setting Bar	GSKT O.D. IN	GSKT O.D. MM	GSKT I.D. IN	GSKT I.D. MM
68 mm / 2.68" Diameter Family															
3/4-16	2.56	65	2.80	71	P502015	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	P502019	FULL FLOW	50% @ 20	TOYOTA 90915-03004				2.46	62	1.94	49
	2.56	65	3.35	85	P502070	FULL FLOW		NISSAN 1520853J00				2.46	62	2.06	52
	2.56	65	2.80	71	P550534	FULL FLOW		DATSUN, TOYOTA SUZUKI	Yes	11-17	0.80-1.00	2.46	62	1.94	49
	2.68	68	2.56	65	P502024	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	P502007	FULL FLOW	50% @ 20	MITSUBISHI MD135737, 30A4000100	Yes	11-17	0.80-1.00	2.67	68	2.15	55
	2.68	68	3.35	85	P502047	FULL FLOW	50% @ 20	ISUZU 94314263				2.58	66	2.15	55
	2.68	68	3.35	85	P502057	BYPASS	50% @ 20	MAZDA FEY014302	Yes			2.56	65	3.03	77
	2.68	68	2.56	65	P502062	FULL FLOW	50% @ 20	KIA				2.58	66	2.17	55
	2.68	68	3.35	85	P502063	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	P502067	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	P551783	FULL FLOW		HONDA 15410MM90003				2.42	61	2.23	57
76 mm / 3.00" Diameter Family															
3/4-16	2.92	74	3.40	86	P552430	FULL FLOW	50% @ 24	HARLEY-DAVIDSON 63805-80A				2.73	69	2.42	61
	2.92	74	4.53	115	P551763	FULL FLOW		KOHLER 1205001, CUB CADET	Yes	8	0.55	2.73	69	2.43	62
	2.91	74	3.31	84	P502016	FULL FLOW	99% @ 50	TOYOTA 90915-03002, 90915-20001							
	3.00	76	3.46	88	P502107	FULL FLOW	50% @ 20	ECHLIN OF18				2.80	71	2.50	64
	3.00	76	3.40	86	P550335	FULL FLOW	50% @ 20	MOPAR L335, CHYRSLER, CLARK, INTER-CEPTOR MARINE	Yes	7-10	0.50 -0.70	2.75	70	2.37	60
	2.99	76	4.72	120	P554770	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	P551251	FULL FLOW		OPEL 2866477		8-11	.60-.80				
	3.00	76	4.74	120	P550400	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	P554408	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	P550598	FULL FLOW	50% @ 25	GM 25010324				2.73	69	2.43	62
	2.96	75	4.45	113	P550505	FULL FLOW	99% @ 40	GM LIGHT TRUCK, AC PF59, PH59	Yes			2.77	70	2.36	60
	2.99	76	3.41	87	P551307	FULL FLOW	99% @ 40	GM 6439857,25010325	Yes			2.84	72	2.47	63
M18 x 1.5	3.00	76	3.40	86	P550047	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	P550051	FULL FLOW	99% @ 45	GMC 25010908	Yes			2.76	70	2.39	61
M20 x 1.5	2.96	75	4.75	121	P552849	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	P502010	FULL FLOW		MITSUBISHI MD322508				2.48	63	2.03	52
M22 x 1.5	3.00	76	3.26	83	P550794	FULL FLOW		GM 2007 LIGHT TRUCK							
80 mm / 3.15" Diameter Family															
3/4-16	3.15	80	3.15	80	P502020	FULL FLOW	50% @ 20	TOYOTA				2.48	63	2.20	56
	3.15	80	2.95	75	P502022	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	P502069	FULL FLOW	50% @ 20	NISSAN 1520801B10				2.46	62	2.00	51
	3.24	82	4.40	112	P550715	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	P550711	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
85 mm / 2.68"Diameter Family															
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
93 mm / 3.54" Diameter Family															
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, ATLS 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 IN	OD MM	Length IN	Length MM	Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting PSI	By-Pass Valve Setting Bar	GSKT O.D. IN	GSKT O.D. MM	GSKT I.D. IN	GSKT I.D. MM
93 mm / 3.54" Diameter Family, continued															
7/8-14	3.67	93	3.75	95	P551287	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	P551784	FULL FLOW		LISTER PETTER 75110620				2.75	70	2.43	62
	3.66	93	3.30	84	P551042	FULL FLOW		BOBCAT 6678233				2.83	72	2.44	62
	3.66	93	3.39	86	P550939	FULL FLOW	99% @ 40	KUBOTA 1732132430		10	.70	2.83	72	2.46	62
	3.66	93	3.57	91	P550939	FULL FLOW	50% @ 21	CUMMINS C6002112110		16	1.10	2.83	72	2.46	63
	3.66	93	4.21	107	P552518	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	P169071	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	P550008	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	P554403	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	P557780	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	P550006	FULL FLOW	99% @ 40	MERCEDES, RVI		36	2.5	2.81	71	2.44	62
	3.66	93	6.85	174	P550299	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	P554407	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	P550942	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	P550941	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	P553411	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	P550318	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	P550963	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	P550939	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	P550939	FULL FLOW	99% @ 36	FORD, ONAN		8-11	0.60-0.80	2.82	72	2.42	61
	3.82	97	3.98	101	P550942	FULL FLOW	50% @ 10	ZETTELMEYER 2138220		36	2.48	2.80	71	2.40	61
5/8-18	3.73	95	4.31	109	P550154	BYPASS	99% @ 45	IHC 538836R1				2.83	72	2.46	62
	3.81	97	5.22	133	P550050	BYPASS	99% @ 45	CAT, AMC, MF, ALLIS 74512207				2.82	72	2.42	61
	3.81	97	5.68	144	P550194	FULL FLOW		WISCONSIN RV38	Yes	12-15	0.80-1.00				
	3.81	97	7.91	201	P553404	BYPASS	99% @ 45	CARRIER TRANSICOLD 30.00304.00				2.82	72	2.42	61
3/4-20	3.69	94	5.43	138	P552363	BYPASS	50% @ 21	THERMO KING 116228				2.83	72	2.46	63
1 1/2-16	3.70	94	5.51	140	P551352	FULL FLOW	99% @ 48	JOHN DEERE RE59754				3.76	96	3.22	82
1 1/8-16	3.66	93	6.81	173	P551348	FULL FLOW	50% @ 16	MITSUBISHI C45702411 , WP110				2.80	71	2.01	51
	3.66	93	6.85	174	P551019	FULL FLOW	99% @ 15	CUMMINS B SERIES				2.83	72	2.44	62
	3.66	93	6.85	174	P550428	FULL FLOW	50% @ 20	CUMMINS "98" B SERIES				2.84	72	2.44	62
	3.81	97	5.22	133	P555570	FULL FLOW	99% @ 45	CAT 8N-9586, 9N-5570				2.81	71	2.42	61
13/16-16	3.66	93	4.34	110	P550551	BYPASS		WISCONSIN RV51				3.44	87	3.10	79
	3.66	93	4.34	110	P550599	FULL FLOW		GM 6437462				2.83	72	2.46	63
	3.66	93	7.87	200	P550832	FULL FLOW	50% @ 20	GMC 6439034				3.38	86	3.04	77
	3.69	94	5.20	132	P551764	FULL FLOW		GM 6438868				3.44	87	3.10	79
	3.69	94	5.36	136	P550518	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	P166564	FULL FLOW	99% @ 22	GM CAR & TRUCK				3.45	88	3.00	76
	3.77	96	3.08	78	P550507	FULL FLOW	99% @ 22	GM LIGHT TRUCK, AC PF454, PH454	Yes			3.57	91	3.16	80
	3.78	96	5.14	131	P550964	FULL FLOW	99% @ 35	GM LIGHT TRUCK	Yes			3.38	86	3.04	77
	3.81	97	4.22	107	P550025	FULL FLOW	99% @ 40	GMC 6CYL. & V8 GAS				3.38	86	3.04	77
	3.81	97	5.12	130	P550035	FULL FLOW	50% @ 20	GM, ACPF35				3.38	86	3.04	77
	3.81	97	5.22	133	P550024	FULL FLOW	99% @ 40	ALLIS CHALMERS, CASE, IHC	Yes			2.82	72	2.42	61
	3.81	97	5.53	140	P550020	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	P558717	BYPASS		CASE A36136, HYSTER 38714, MF 835652M91							
	3.79	96	6.02	153	P552404	BYPASS	50% @ 10	OLIVER 100126ASA; WHITE 1LA5507				3.05	77	2.68	68
	3.79	96	8.13	206	P552464	FULL FLOW		OLIVER 250046, 100125ASA; WAUKESHA 119390A, K5507				3.05	77	2.68	68
M18 x 1.5	3.70	94	3.72	95	P550242	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	P502092	FULL FLOW	50% @ 20	PROTON				2.44	62	1.98	50
	3.54	90	3.93	100	P502039	FULL FLOW	50% @ 20	ISUZU 8944309830				3.43	87	3.01	76
	3.66	93	3.95	100	P550933	FULL FLOW	50% @ 19	ISUZU 8-9421-7272-0				3.42	87	3.01	76
	3.64	92	4.92	125	P550412	BYPASS	50% @ 5	MAZDA SL5014V61				3.43	87	2.08	53
	3.66	93	3.39	86	P550935	FULL FLOW		CHRYSLER		8-10	0.60-0.70	2.63	67		
	3.66	93	5.35	136	P550934	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	P502048	FULL FLOW	50% @ 20	HONDA 15400-PA6-305				2.52	64	2.27	58
	3.64	92	5.47	139	P502072	FULL FLOW	50% @ 20	MOTORCRAFT				2.75	70		
	3.67	93	3.58	91	P550965	FULL FLOW	50% @ 20	FORD LIGHT TRUCK	Yes	15	1.03	2.81	71	2.42	61
	3.67	93	5.42	138	P550166	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	P550357	FULL FLOW		FORD 844F6716AA	Yes	10-15	0.70-1.00	3.54	90	3.03	77
	3.82	97	5.51	140	P553315	FULL FLOW		FORD 785F-6714-AA3A				2.82	72	2.45	62
M24 x 1.5	3.66	93	5.35	136	P550758	FULL FLOW	99% @ 40	JOHN DEERE RE519626, RE518977		24	1.70	2.83	72	2.44	62
	3.75	95	6.88	175	P550975	FULL FLOW		VALMET 836136342	Yes	34-37	2.40-2.60				
M26 x 1.5	3.54	90	4.92	125	P502043	COMBINATION	50% @ 20	ISUZU 8943604271				3.44	87	3.00	76
	3.58	91	4.92	125	P502058	COMBINATION	50% @ 20	DAIHATSU, ISUZU, MAZDA				3.43	87	3.00	76
	3.66	93	6.92	176	P557382	COMBINATION	99% @ 25	THERMO KING 117382,				2.81	71	2.42	61
M27 x 2	3.85	98	6.89	175	P550520	FULL FLOW		DAF 1399494				2.83	72	2.44	62
M92 x 2.5-6H	3.66	93	5.94	151	P550779	FULL FLOW	99% @ 40	JOHN DEERE RE504836							
100 mm / 3.94" Diameter Family															
1-12	3.96	101	4.92	125	P502060	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	P550411	FULL FLOW		MAZDA 130523802		11-17	0.80-1.00	3.92	100	3.48	88
	3.98	101	5.85	149	P505956	FULL FLOW		HINO							
	4.02	102	5.91	150	P550409	FULL FLOW	50% @ 16	MAZDA SL0223802				3.92	100	3.46	88
	4.02	102	5.91	150	P502080	FULL FLOW	50% @ 20	MITSUBISHI 32B4000100	Yes			3.91	99	3.46	88
	4.00	102	5.92	150	P550422	FULL FLOW		HITACHI 4183853, ISUZU 8943212191	Yes	17	1.20	3.92	100	3.48	88
	4.02	102	5.91	150	P502476	FULL FLOW	99% @ 39	MITSUBISHI 32B4020100	Yes			3.90	99	3.46	88
M24 x 1.5	3.93	100	3.30	84	P502017	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	P502061	COMBINATION		MAZDA VSY114302				3.35	85	2.17	55
	4.02	102	5.31	135	P551343	BYPASS	50% @ 16	MITSUBISHI MD069782	Yes	12-16	0.80-1.00	2.87	73	1.77	45
	4.02	102	6.02	153	P550406	FULL FLOW	50% @ 16	HINO 156071480	Yes	11-17	0.80-1.00	2.87	73	2.20	56

Spin-On Filters

Thread	OD IN	OD MM	Length IN	Length MM	Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting PSI	By-Pass Valve Setting Bar	GSKT O.D. IN	GSKT O.D. MM	GSKT I.D. IN	GSKT I.D. MM
108 mm / 4.25" Diameter Family															
1-12	4.21	107	3.96	101	P502085	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	P502032	COMBINATION	50% @ 20	ISUZU 8941432050				2.90	74	2.15	55
	4.23	107	5.79	147	P559126	FULL FLOW	99% @ 40	FORD E7HZ6731A (BRAZIALIAN CAB FORWARD)		18-23	1.30-1.60	2.82	72	2.42	61
	4.25	108	6.61	168	P553871	FULL FLOW	50% @ 20	THERMOKING 11.3871				2.82	72	2.42	61
	4.27	108	8.00	203	P550319	FULL FLOW	99% @ 25	IHC 1811953C1 FOR DT/DTA360 & 466 DIESEL ENG				2.82	72	2.42	61
	4.27	108	9.09	231	P550393	FULL FLOW	99% @ 40	MERCEDES TRUCK 0031841701				2.82	72	2.44	62
	4.25	108	9.13	232	P551604	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	P550152	FULL FLOW	99% @ 40	FIAT ALLIS, A.CHALMERS 4023548-3				2.83	72	2.45	62
	4.28	109	7.33	186	P552474	FULL FLOW		ALLIS CHALMERS 4037047				2.83	72	2.46	63
7/8-16	4.27	108	8.06	205	P550714	FULL FLOW	99% @ 40	WHITE 30-3068145	Yes	18-25	1.30-1.70	2.82	72		
	4.23	108	7.95	202	P559130	FULL FLOW	99% @ 40	CASEIH A62423				2.83	72	2.44	62
3/4-16	4.24	108	6.59	167	P551267	FULL FLOW	99% @ 30	NISSAN 15201Z9008				2.82	72	2.46	62
	4.26	108	7.25	184	P551603	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	P550580	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	P550226	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	P553746	BYPASS	99% @ 12	THERMO KING 11.3746				2.83	72	2.45	62
1 1/2-12	4.25	108	10.42	265	P502081	FULL FLOW	50% @ 16	MITSUBISHI 3754001101				4.02	102	3.42	87
1-1/2–16	4.23	107	5.79	147	P559127	FULL FLOW	99% @ 40	FORD E3TZ6731A, IHC 6.9L 1804442C1				3.89	99	3.55	90
	4.27	108	8.02	204	P550371	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	P550086	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	P550708	FULL FLOW	99% @ 45	KOMATSU 6134-51-5120	Yes	27	1.86	3.94	100	3.58	91
	4.24	108	6.73	171	P551266	FULL FLOW		NISSAN FL201Z9010				4.01	102	3.60	91
	4.24	108	7.02	178	P551263	FULL FLOW		VOLVO 8477416				3.94	100	3.56	90
	4.25	108	10.24	260	P550519	FULL FLOW		M&H W11102/20							
	4.25	108	10.31	262	P554004	FULL FLOW	50% @ 20	CATERPILLAR 1R-0658, 2P-4004				3.89	99	3.55	90
	4.24	108	10.32	262	P553191	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	DBL7483	FULL FLOW	99% @ 15	EXTENDED SERVICE MACK/VOLVO ENGINES				3.88	99	3.55	90
	4.25	108	10.31	262	DBL7739	FULL FLOW	99% @ 15	EXTENDED SERVICE CAT ENGINES				3.88	99	3.55	90
	4.25	108	10.32	262	P551807	FULL FLOW	99% @ 21	CATERPILLAR 1R1807, MACK 485GB3236				3.89	99	3.55	90
	4.23	107	5.79	147	P559128	FULL FLOW	99% @ 40	CAT 9N-6007				3.94	100	3.55	90
	4.33	110	6.38	162	P550420	FULL FLOW	50% @ 20	HITACHI 4296675				4.13	105	3.74	95
	4.33	110	6.73	171	P502088	FULL FLOW	50% @ 16	NISSAN 15201Z9000, 15201Z9002, 15201Z9003				3.90	99	3.46	88
	4.33	110	10.08	256	P551102	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	P550490	FULL FLOW		SCANIA 1117285				4.09	104	3.66	93
	4.45	113	6.73	171	P502083	FULL FLOW	99% @ 48	MITSUBISHI 3743802400				2.93	74	2.54	65
1 3/8-16	4.29	109	10.36	263	P550425	BYPASS	99% @ 35	VOLVO 4775565				3.99	101	3.63	92
M20 x 1.5	4.13	105	3.15	80	P550383	FULL FLOW		ISUZU 8941145850				3.92	100	3.52	89
	4.20	107	4.98	126	P550067	FULL FLOW	50% @ 16	MITSUBISHI ME014833, ME004099				3.90	99	3.46	88
	4.24	108	5.62	143	P551264	FULL FLOW		KOMATSU/KOMATSU DRESSER Z1402OF105		20	1.38	3.94	100	3.56	90
	4.33	110	6.38	162	P551257	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	P550597	COMBINATION		TOYOTA 9091503006, 9091530002				3.15	80	2.80	71
M26 x 1.5	4.21	107	5.90	150	P502008	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	P550707	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	P559129	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	P502222	FULL FLOW	50% @ 16	FIAT 74741272	Yes			2.83	72	2.44	62
	4.27	108	9.00	229	P550712	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	P550342	FULL FLOW	50% @ 12	IVECO 1902102	Yes	36	2.48	4.06	103	3.62	92
	4.45	113	8.92	227	P550639	FULL FLOW	50% @ 14								
M32 x 1.5	4.25	108	8.77	223	P502093	COMBINATION	50% @ 20	CATERPILLAR 5I7950		25-31	1.80-2.20	4.02	102	3.62	92
118 mm / 4.65" Diameter Family															
1 1/2-12	4.65	118	6.22	158	DBL7947	FULL FLOW	99% @ 15	EXTENDED SERVICE DETROIT DIESEL ENGINES				4.31	109	3.84	98
	4.65	118	8.09	205	P550596	FULL FLOW	99% @ 25	HITACHI 4448336		20	1.40	4.33	110	3.85	98
	4.65	118	10.24	260	P551670	FULL FLOW	50% @ 14	CUMMINS 3313279, DET DIESEL ENG				4.32	110	3.85	98
	4.65	118	10.24	260	DBL7670	FULL FLOW	99% @ 15	EXTENDED SERVICE CUMMINS AND DETROIT DIESEL ENGINES				4.31	109	3.84	98
	4.65	118	10.24	260	P167670	FULL FLOW	99% @ 15	MERCEDES 23518524				4.31	109	3.84	98
	4.67	119	6.28	159	P550947	FULL FLOW	50% @ 14	GMC 25011106, DETROIT DIESEL ENGINES				4.32	110	3.85	98
	4.67	119	7.85	199	P551381	FULL FLOW	50% @ 20	HINO 15607-1381				4.32	110	3.85	98
	4.67	119	8.94	227	P550671	FULL FLOW	50% @ 14	CUMMINS				4.32	110	3.85	98
	4.86	123	5.87	149	P550973	COMBINATION	50% @ 20	ISUZU 8970492820, FULL FLOW BYPASS				4.32	110	3.85	98
	4.88	124	4.72	120	P502042	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	P502046	COMBINATION	50% @ 20	ISUZU 8970967770, 8943381811				4.59	116	3.86	98
1 1/2-16	4.65	118	7.83	199	P552050	FULL FLOW	99% @ 39	HINO 156072050				4.32	110	3.85	98
	4.65	118	7.83	199	P551441	FULL FLOW	99% @ 21	HINO 156072190				4.09	104	3.86	98
	4.65	118	11.73	298	DBL7405	FULL FLOW	99% @ 15	EXTENDED SERVICE CAT ENGINES				4.32	110	3.85	98
	4.67	119	11.75	298	P554105	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	P550073	FULL FLOW	50% @ 25	NISSAN 15208-Z9001				3.34	85	2.95	75
1 3/4-12	4.66	118	11.26	286	P551145	FULL FLOW	99% @ 20	NAVISTAR 1889124C91				4.33	110	3.86	98
1 3/8-16	4.66	118	9.91	252	P550421	FULL FLOW	99% @ 50	HITACHI 4266385, ISUZU 11324010521				4.33	110	3.85	98
	4.65	118	10.24	260	P550777	BYPASS	50% @ 14	CUMMINS 330432, 3313289				4.32	110	3.85	98
1 5/8-12	4.65	118	10.24	260	DBL3998	FULL FLOW	99% @ 15	EXTENDED SERVICE DETROIT DIESEL SERIES 60 ENGINES				4.31	109	3.84	98
	4.65	118	10.24	260	P551016	FULL FLOW	99% @ 15	DETROIT DIESEL SERIES 60 ENGINES				4.31	109	3.84	98
	4.65	118	10.24	260	P552100	FULL FLOW	99% @ 30	DET. DIESEL 50 & 60 SERIES ENGINES				4.32	110	3.85	98
	4.66	118	10.24	260	P551146	FULL FLOW	99% @ 20	NAVISTAR 1889119C91				4.33	110	3.86	98
2 1/4-12	4.65	118	8.94	227	P553548	COMBINATION	99% @ 15	CASE IH J919562				4.68	119	4.00	102
	4.65	118	11.70	297	P553000	COMBINATION	99% @ 22	CUMMINS ENGINES				4.68	119	4.00	102
	4.65	118	11.75	298	DBL7300	COMBINATION	99% @ 15	EXTENDED SERVICE CUMMINS ENGINES				4.68	119	4.00	102
M52 x 1.5	4.66	118	11.70	297	P550595	COMBINATION	99% @ 22	JOHN DEERE VENTURI COMBO				4.68	119	4.01	102
M90 x 2.0	4.79	122	11.85	301	P554560	FULL FLOW	99% @ 15	CUMMINS QSK ENGINES				4.68	118	3.85	98
M95 x 2.0	4.65	118	13.67	347	P552025	COMBINATION	99% @ 30	IH DT466 2004 ON				4.68	119	4.00	102

Spin-On & Cartridge Filters

Thread	OD IN	OD MM	Length IN	Length MM	Part No.	Part Description	Efficiency @ Micron	Primary Application	Anti-Drain Back Valve	By-Pass Valve Setting PSI	By-Pass Valve Setting Bar	GSKT O.D. IN	GSKT O.D. MM	GSKT I.D. IN	GSKT I.D. MM
118 mm / 4.65" Diameter Family, continued															
M95 x 2.5	4.65	118	11.70	297	DBL7900	FULL FLOW	99% @ 15	EXTENDED SERVICE CUMMINS ISX				4.68	119	4.00	102
	4.65	118	11.70	297	P550949	FULL FLOW	99% @ 30	OEM EFFICIENCY CUMMINS ISX				4.68	119	4.00	102
	4.66	118	11.70	297	P559000	FULL FLOW	99% @ 22	HIGH EFFICIENCY CUMMINS ISX				4.68	119	4.00	102
	4.67	119	11.70	297	DBL2501	FULL FLOW	99% @ 15	EXTENDED SERVICE CUMMINS ISX				4.64	118	3.97	101
136 mm / 5.36" Diameter Family															
1 1/2-12	5.06	129	6.72	171	P558329	FULL FLOW	50% @ 25	JOHN DEERE AR98329							
1 1/2-16	5.00	127	6.85	174	P553634	FULL FLOW	50% @ 20	MICH FP, JOHN DEERE AR43634				5.05	128	4.71	120
	5.32	135	9.61	244	P550788	FULL FLOW	99% @ 21	CATERPILLAR C13 ENGINES				4.31	109	3.92	99
	5.33	135	12.13	308	P551402	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	P551808	FULL FLOW	99% @ 21	CATERPILLAR 1R1808				4.31	109	3.92	100
	5.33	135	12.13	308	P554005	FULL FLOW	99% @ 39	CAT 1R-0716, 2P-4005, STGR, SULLAIR				4.31	109	3.92	100
	5.35	136	9.68	246	P554206	FULL FLOW	99% @ 40	IHC 684206C1				4.29	109	3.89	99
	5.55	141	12.20	310	P550341	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	P550157	FULL FLOW		FORD EDNN6714AA				4.37	111	3.97	101
13/16-16	5.44	138	5.44	138	P550188	FULL FLOW	99% @ 45	CUMMINS 170200		8-10	0.60-0.70				
M36 x 1.5	5.12	130	8.66	220	P552562	COMBINATION	99% @ 45	MITSUBISHI ME074013				4.21	107	3.86	98
	5.33	135	12.13	308	DBL7367	FULL FLOW		EXTENDED SERVICE NAVISTAR 1819452C1				4.29	109	3.89	99
	5.33	135	12.10	308	P550512	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	P550367	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	P550452	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	P551400	FULL FLOW	50% @ 14	DETROIT DIESEL 4000 SERIES ENGINE				4.31	109	3.92	100
M60 x 3	5.48	139	6.62	168	P550356	COMBINATION		FORD 826F6714		10-15	0.70-1.00				

Cartridge Lube Filters

Outer Dia. IN	Outer Dia. MM	Inner Dia. IN	Inner Dia. MM	Length IN	Length MM	Part No.	Part Description	Efficiency @ Micron	Primary Application
1.97	50	0.46	12	1.48	38	P552421	CARTRIDGE FULL FLOW		HONDA 15410-KF0-315, 15412-KF0-000
2.00	51	0.81	21	2.12	54	P555400	CARTRIDGE FULL FLOW		LISTER, PETTER
2.09	53	0.77	20	3.86	98	P552361	CARTRIDGE FULL FLOW		GMC 25177917
2.30	58	0.44	11	4.63	118	P551294	CARTRIDGE FULL FLOW		CASE IH 376373R91
2.36	60	0.63	16	3.94	100	P550744	CARTRIDGE		MERCEDES-BENZ A0002690321
2.35	60	0.70	18	3.90	99	P550396	CARTRIDGE FULL FLOW	50% @ 25	MERCEDES 001844901, 00184425
2.44	62	0.86	21	6.20	157	P550521	CARTRIDGE FULL FLOW		MERCEDES 1041800109
2.48	63	1.08	27	3.53	90	P552419	CARTRIDGE FULL FLOW		FORD D0HZ-3C602-B; INTERNATIONAL 507809-C91
2.50	64	1.22	31	4.53	115	P550564	CARTRIDGE FULL FLOW		MERCEDES 6111800009
2.50	64	1.22	31	5.91	150	P550633	CARTRIDGE		VOLVO 1521527 / M&H HU721
2.59	66	1.22	31	4.52	115	P550798	CARTRIDGE	99% @ 39	MERCEDES 0001802609
2.75	70	1.31	33	3.33	85	P551291	CARTRIDGE FULL FLOW		LEYLAND 134311
2.75	70	1.31	33	6.00	152	P550183	CARTRIDGE FULL FLOW	99% @ 36	FORD E1ADKN18662A
2.79	71	1.22	31	3.74	95	P550797	CARTRIDGE	99% @ 38	MERCEDES 6421800009
2.83	72	0.83	21	4.47	114	P550184	CARTRIDGE FULL FLOW	50% @ 20	FORD A730X6731TA
2.85	72	1.30	33	5.39	137	P502193	CARTRIDGE FULL FLOW	50% @ 20	ISUZU
2.85	72	1.30	33	5.39	137	P550052	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	P505978	CARTRIDGE		NISSAN 15208-2W200
2.90	74	1.12	28	5.53	140	P552382	CARTRIDGE FULL FLOW		INTERNATIONAL 406669-R1 406705-R91
2.97	75	1.07	27	5.64	143	P551296	CARTRIDGE FULL FLOW	99% @ 30	CASE IH A40902
2.98	76	0.78	20	4.07	103	P551279	CARTRIDGE FULL FLOW		CHRYSLER 1634447
3.03	77	1.02	26	8.19	208	P550927	CARTRIDGE FULL FLOW	99% @ 45	CATERPILLAR 9T-9054
3.11	79	0.75	19	9.37	238	P550311	CARTRIDGE FULL FLOW	50% @ 10	LEYLAND 602426
3.09	79	1.03	26	1.56	40	P552402	CARTRIDGE FULL FLOW		CASE A22279; INTERNATIONAL 133205-R91
3.11	79	1.38	35	9.04	230	P550165	CARTRIDGE FULL FLOW		CAT, LINK BELT 9F6742, LEROI
3.11	79	1.56	40	5.35	136	P502203	CARTRIDGE FULL FLOW	50% @ 20	NISSAN 1520876225
3.12	79	1.83	46	9.00	229	P550816	CARTRIDGE FULL FLOW	50% @ 20	CAT 4J-0816
3.22	82	1.50	38	7.89	200	P550451	CARTRIDGE		M.A.N. 51055040096
3.26	83	0.48	12	7.58	193	P550181	CARTRIDGE	99% @ 20	IHC 376375R91
3.27	83	0.83	21	5.16	131	P550767	CARTRIDGE FULL FLOW		MERCEDES OM SERIES ENGINES
3.27	83	0.83	21	7.60	193	P550764	CARTRIDGE FULL FLOW		MERCEDES, M.A.N., CLAAS
3.27	83	0.94	24	5.12	130	P550766	CARTRIDGE FULL FLOW		MERCEDES 3661840225
3.24	83	1.41	36	6.65	169	P550563	CARTRIDGE FULL FLOW		MERCEDES 6061840125
3.27	83	1.49	38	6.36	161	P552422	CARTRIDGE FULL FLOW		BMW 11421745390 11421745391
3.27	83	1.59	40	5.80	147	P550768	CARTRIDGE FULL FLOW	99% @ 40	MERCEDES 0001801609
3.27	83	2.00	51	8.24	209	P550761	CARTRIDGE FULL FLOW	50% @ 15	MERCEDES 0001801709
3.26	83	2.20	56	7.59	193	P550763	CARTRIDGE FULL FLOW		METAL FREE LUBE
3.27	83			5.39	137	P550766	CARTRIDGE FULL FLOW		MERCEDES, DEMAG, LIEBHERR, O&K, RVI, CLAAS
3.25	83			7.13	181	P550528	CARTRIDGE FULL FLOW	99% @ 25	FORD 3C3Z6731AA F SERIES PICKUP
3.31	84	0.65	17	5.63	143	P550015	CARTRIDGE FULL FLOW	50% @ 16	ISUZU 9885111940
3.31	84	0.75	19	4.21	107	P550220	CARTRIDGE FULL FLOW		SCANIA 1329876, 1381235
3.30	84	0.93	24	7.50	190	P550315	CARTRIDGE FULL FLOW		MERCEDES 3661800009
3.35	85	1.57	40	5.63	143	P502194	CARTRIDGE FULL FLOW	50% @ 16	ISUZU 13240085,
3.34	85	1.62	41	6.50	165	P555088	CARTRIDGE FULL FLOW	99% @ 38	JOHN DEERE AT15088T, PURO R14
3.37	86	1.13	29	4.25	108	P552465	CARTRIDGE		JOHN DEERE AH1081R
3.47	88	0.43	11	7.61	193	P552471	CARTRIDGE FULL FLOW		MERCEDES-BENZ 6171840025, 6171840125
3.52	89	0.69	18	4.16	106	P550179	CARTRIDGE	50% @ 10	CASE 08152AB
3.47	89	0.94	24	5.53	141	P550186	CARTRIDGE	99% @ 20	IHC 355009R91
3.50	89	1.34	34	3.78	96	P551285	CARTRIDGE FULL FLOW		PERKINS 101606
3.56	90	1.28	33	5.69	145	P550141	CARTRIDGE FULL FLOW	50% @ 20	JOY, GMC 5576054, 5574540
3.54	90	1.92	49	4.09	104	P502202	CARTRIDGE FULL FLOW	50% @ 20	ISUZU 1878103720
3.58	91	0.47	12	6.42	163	P550361	CARTRIDGE COMBINATION		MERCEDES 6011800009
3.59	91	1.28	33	6.37	162	P552415	CARTRIDGE FULL FLOW		GMC 5573976
3.62	92	0.51	13	5.83	148	P550359	CARTRIDGE FULL FLOW		ROLLS ROYCE OE12448
3.62	92	0.69	18	4.33	110	P502179	CARTRIDGE FULL FLOW	50% @ 20	MITSUBISHI 3134012030
3.62	92	0.69	18	6.30	160	P502180	CARTRIDGE FULL FLOW	50% @ 20	MITSUBISHI 3144012030
3.63	92	1.31	33	7.88	200	P552375	CARTRIDGE SOCK		OLIVER 156149AS; WAUKESHA 493009; WHITE 872946
3.75	95	1.04	26	5.94	151	P550092	CARTRIDGE FULL FLOW	99% @ 25	AC, CASE, CAT, CLARK, FTGD LF503
3.74	95	1.91	49	7.05	179	P502225	CARTRIDGE FULL FLOW	50% @ 16	LEYLAND 11K243
3.78	96	1.10	28	5.96	151	P552458	CARTRIDGE FULL FLOW		CASE D45378, G33058, A60524, A61234
3.78	96	1.10	28	6.09	155	P552455	CARTRIDGE FULL FLOW		CASE D45378, G33058, A60524, A61234
3.82	97	1.35	34	4.41	112	P550185	CARTRIDGE FULL FLOW	50% @ 20	MASSEY FERGUSON 1852331M1
3.82	97	1.73	44	5.74	146	P550076	CARTRIDGE		NISSAN 15274-99428
3.82	97			5.80	147	P574862	CARTRIDGE		MERCEDES 900 SERIES ENGINES
3.83	97			5.80	147	P574863	CARTRIDGE		NAVISTAR MAXXFORCE ENGINES

Cartridge Filters

Outer Dia. IN	Outer Dia. MM	Inner Dia. IN	Inner Dia. MM	Length IN	Length MM	Part No.	Part Description	Efficiency @ Micron	Primary Application
Cartridge Lube Filters									
3.87	98	0.49	13	4.58	116	P550287	CARTRIDGE		MACK 57GC2187
3.87	98	0.64	16	4.58	116	P550286	CARTRIDGE FULL FLOW		MACK 57GC2134
3.84	98	7.00	178			P552206	CARTRIDGE		MACK ASET
3.91	99	0.57	15	4.37	111	P550203	CARTRIDGE FULL FLOW	99% @ 20	FIAT ALLIS, CASE, CLARK, MF, HYSTER,GALION
3.89	99	0.66	17	5.67	144	P550074	CARTRIDGE		NISSAN 15274-Z9029
3.93	100	0.87	22	4.81	122	P551475	CARTRIDGE FULL FLOW	99% @ 40	CASE A21475, ALLIS CHALMERS
3.94	100	1.56	40	7.19	183	P502206	CARTRIDGE FULL FLOW	50% @ 16	NISSAN 1527499128
3.94	100	1.73	44	7.24	184	P550077	CARTRIDGE FULL FLOW	50% @ 16	NISSAN 15274-90225
3.98	101	0.65	17	7.68	195	P550070	CARTRIDGE FULL FLOW	50% @ 25	MITSUBISHI ME034481
3.98	101	1.10	28	9.25	235	P550068	CARTRIDGE FULL FLOW	50% @ 25	MITSUBISHI ME021254
3.97	101	1.20	30	9.21	234	P502183	CARTRIDGE FULL FLOW		MITSUBISHI ME021073
3.98	101	1.27	32	2.78	71	P551761	CARTRIDGE FULL FLOW		CASE 902125
3.98	101	1.63	41	9.29	236	P550484	CARTRIDGE FULL FLOW	50% @ 20	CAT 1R-0659, 4W-4840, KOMATSU 6610-53-5120
4.00	102	0.56	14	5.00	127	P550170	CARTRIDGE		FRAM F4
4.00	102	0.56	14	5.00	127	P550171	CARTRIDGE		FRAM F21
4.02	102	0.55	14	8.00	203	P550117	CARTRIDGE	99% @ 20	CLARK EUCLID GMC 5572425 (MILITARY SEN.)
4.03	102	0.66	17	4.67	119	P551277	CARTRIDGE		DELUXE WD30
4.02	102	1.76	45	9.92	252	P550629	CARTRIDGE		SCANIA 164 SERIE, SCANIA MARINE ENGINES DI SERIES
4.06	103	1.62	41	5.50	140	P553335	CARTRIDGE FULL FLOW	99% @ 40	IHC, GALION, HOUGH, TOWMOTOR
4.06	103			5.73	146	P550952	CARTRIDGE	50% @ 17	MANN & HUMMEL ZR905Z, DAF 1643072
4.09	104	0.59	15	5.67	144	P550062	CARTRIDGE FULL FLOW	50% @ 16	HITACHI 4507886
4.10	104	0.59	15	9.13	232	P550059	CARTRIDGE FULL FLOW	50% @ 16	HITACHI 4505384
4.09	104	1.26	32	6.69	170	P550080	CARTRIDGE FULL FLOW	50% @ 16	HINO 6071-2104-40
4.09	104	1.26	32	7.09	180	P550379	CARTRIDGE FULL FLOW	50% @ 25	HINO 156071560
4.09	104	1.92	49	6.30	160	P550010	CARTRIDGE FULL FLOW	50% @ 20	HINO 15607-1090
4.17	106	0.59	15	4.17	106	P550017	CARTRIDGE FULL FLOW	50% @ 25	ISUZU 9885132630
4.17	106	0.59	15	7.30	185	P550018	CARTRIDGE FULL FLOW	50% @ 16	ISUZU 9885132641
4.25	108	1.25	32	16.38	416	P552427	CARTRIDGE SOCK		WINSLOW W1645T
4.30	109	1.45	37	8.90	226	P550132	CARTRIDGE FULL FLOW	99% @ 30	DET. DIESEL ENG W/CARTRIDGE LUBE
4.29	109	7.44	189			P552231	CARTRIDGE		MACK E7
4.33	110	0.75	19	7.56	192	P550378	CARTRIDGE FULL FLOW	50% @ 25	MITSUBISHI ME034605
4.33	110	2.04	52	8.11	206	P502205	CARTRIDGE FULL FLOW	50% @ 16	NISSAN 1527499025
4.38	111	1.44	37	5.75	146	P550147	CARTRIDGE SOCK	99% @ 40	GMC 5574978
4.38	111	1.59	40	31.00	787	P550614	CARTRIDGE	95% @ 15	WAUKESHA 168660
4.37	111	3.62	92	9.56	243	P552469	CARTRIDGE FULL FLOW		JOHN DEERE AT45422
4.41	112	2.22	56	5.91	150	P550630	CARTRIDGE FULL FLOW		DAF 75CF, DAF 85CF, DAF 95 XF
4.44	113	2.31	59	8.66	220	P550812	CARTRIDGE	99% @ 38	ENERGETICS, DIRECT BONDING, DAF 1643070
4.44	113	2.67	68	8.66	220	P550661	CARTRIDGE		DAF 85CF AND XF95
4.50	114	1.45	37	16.00	406	P552428	CARTRIDGE SOCK		WAUKESHA 167602B
4.47	114	1.75	44	9.06	230	P558462	CARTRIDGE FULL FLOW		IHC 268462R91, CUMMINS 104428
4.48	114	2.84	72	10.83	275	P502184	CARTRIDGE FULL FLOW	50% @ 16	MITSUBISHI 68937310012
4.53	115	2.24	57	7.68	195	P554925	CARTRIDGE FULL FLOW		M.A.N. 81.05504.0025
4.57	116	2.12	54	12.68	322	P550071	CARTRIDGE FULL FLOW	50% @ 25	MITSUBISHI ME064289
4.59	117	0.75	19	4.87	124	P551014	CARTRIDGE FULL FLOW		FORD C5TE6744A
4.59	117	2.25	57	7.00	178	P550174	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	P550453	CARTRIDGE		MERCEDES A5411840225
4.70	119	2.16	55	7.60	193	P558425	CARTRIDGE FULL FLOW		MERCEDES 4011840025
4.75	121	2.09	53	10.35	263	P551005	CARTRIDGE	50% @ 17	DETROIT A4721800109 (DD15)
4.76	121	1.50	38	7.44	189	P550613	CARTRIDGE FULL FLOW	99% @ 48	CUMMINS 173174
4.76	121	2.20	56	5.67	144	P550765	CARTRIDGE FULL FLOW		M.A.N. 51.05504.0098
4.76	121	2.20	56	9.60	244	P550041	CARTRIDGE FULL FLOW	50% @ 20	MERCEDES BENZ 001 1843825, M.A.N.
4.76	121	2.24	57	9.76	248	P550769	CARTRIDGE FULL FLOW	99% @ 30	MERCEDES 0001802109
4.76	121	2.24	57	8.05	205	P551108	CARTRIDGE	99% @ 25	NAVISTAR 3006874C91, MAXX FORCE ENGINES 2007-2009
4.80	122	0.67	17	8.62	219	P502190	CARTRIDGE FULL FLOW	50% @ 5	HINO 15607-1351
4.81	122	0.66	17	8.86	225	P550058	CARTRIDGE		HINO 156071010
4.80	122	0.67	17	9.80	249	P502191	CARTRIDGE FULL FLOW	50% @ 5	HINO 156071341, 15607-1340
4.84	123	0.79	20	5.43	138	P502186	CARTRIDGE FULL FLOW	50% @ 20	TOYOTA
4.84	123	2.25	57	8.86	225	P553925	CARTRIDGE FULL FLOW	99% @ 36	MERCEDES BENZ 0011843925
5.06	127	0.07	2	12.13	305	P552377	CARTRIDGE FULL FLOW		NUGENT LUBE BAG REPLACEMENT CARTRIDGE
5.00	127	0.69	18	7.88	200	P551781	CARTRIDGE		WAUKESHA 73759B
5.00	127	0.77	19	8.22	209	P552462	CARTRIDGE FULL FLOW		Ford B8C-6731-A
5.00	127	1.50	38	9.62	244	P550516	CARTRIDGE FULL FLOW	50% @ 20	CUMMINS 158139
5.04	128	0.61	15	6.30	160	P550021	CARTRIDGE FULL FLOW	50% @ 25	NISSAN 15274-99329
5.04	128	0.79	20	7.91	201	P550380	CARTRIDGE FULL FLOW	50% @ 25	ISUZU 1878103141
5.04	128	2.22	56	9.10	231	P550087	CARTRIDGE FULL FLOW		KOMATSU 6610-50-5100
5.02	128	2.26	57	5.59	142	P550066	CARTRIDGE FULL FLOW	50% @ 20	MITSUBISHI 31240-53054
5.06	129	2.94	75	9.00	229	P552380	CARTRIDGE FULL FLOW		INTERNATIONAL 623017-C1
5.07	129	3.34	85	9.00	229	P166481	CARTRIDGE FULL FLOW	99% @ 22	CAT 5S-0485
5.08	129	3.37	86	8.94	227	P550485	CARTRIDGE FULL FLOW	50% @ 14	CAT 1R-0721, 5S-0485, HYSTER 75669
5.12	130	0.59	15	9.17	233	P550034	CARTRIDGE FULL FLOW	50% @ 5	NISSAN 15274-99227
5.12	130	0.59	15	11.79	299	P550065	CARTRIDGE KIT	99% @ 48	MITSUBISHI ME064356
5.51	140	1.34	34	7.60	193	P502200	CARTRIDGE FULL FLOW	50% @ 20	ISUZU 1132401170
6.01	153	3.50	89	14.50	368	P551336	CARTRIDGE FULL FLOW	50% @ 25	FLEETLIFE FP614-40
6.30	160	0.28	7	5.20	132	P551345	CARTRIDGE	50% @ 5	HITACHI 4231195
6.30	160	0.67	17	10.51	267	P550423	CARTRIDGE		HITACHI 4225367
6.50	165	1.47	37	29.38	746	P550636	CARTRIDGE	99% @ 35	P22 RR & MARINE
6.50	165	1.69	43	7.56	192	P551344	CARTRIDGE		HITACHI 4208241
6.50	165	6.50	165	13.00	330	P550381	CARTRIDGE		ISUZU 1878100501
6.50	165	11.02	280	11.02	280	P550382	CARTRIDGE		ISUZU 1878102390
6.50	165	11.02	280	12.95	329	P550384	CARTRIDGE	50% @ 5	ISUZU 1132400560
6.50	165	3/8-24		8.75	222	P552041	CARTRIDGE		ISUZU/GMC CAB FORWARD HOUSING
6.75	171	2.47	63	17.75	451	P552414	CARTRIDGE SOCK		WHITE 673374
7.42	188	2.63	67	10.00	254	P557500	CARTRIDGE FULL FLOW	50% @ 20	CAT 7N-7500
7.42	188	3.43	87	13.38	340	P554136	CARTRIDGE FULL FLOW	50% @ 20	CAT 1W-4136
7.64	194	4.65	118	6.71	170	P502223	CARTRIDGE FULL FLOW	50% @ 20	MANN H20211
7.72	196	0.86	22	10.06	256	P550500	CARTRIDGE	50% @ 5	500 SERIES BYPASS
7.72	196	0.86	22	15.06	383	P550750	CARTRIDGE	50% @ 5	750 SERIES CARTRIDGE BYPASS
7.72	196	0.86	22	15.06	383	P550751	CARTRIDGE	50% @ 5	750 SERIES PREMIUM BYPASS
7.87	200	0.86	22	10.03	255	P550493	CARTRIDGE		CUMMINS 106621

Donaldson FILTRATION SOLUTIONS

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

STANDARD 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

CROSSES TO:

Cummins 2882674 / Fleetguard LF9080

High Efficiency

STANDARD SEALS

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

HEAVY-DUTY SEALS

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

Tested per ISO 4548/12 and ISO 3968.

See brochure F113026 for further performance information.
www.donaldson.com/en/engine/support/datalibrary/084768.pdf