

Why an Air Filtration System is So Important



There Is Something In the Air

Air is not only vital for any life form on earth but also important for today's state of the art diesel engines. An average Heavy Duty Diesel truck engine requires between 3,650 to 5,600 gallons (13,000 to 20,000 liters) of air to burn just one liter of fuel. However, this air is polluted with all kinds of contaminants, such as fumes, dust, smog and other particles. Like temperature and humidity, these particles are not always visible to the eye, but they are harmful to the engine. They diminish the purity of the air and can lead to severe damage of all engine components. Under normal highway conditions, the air consumed by a 16 liter engine contains almost 20 kilograms of dirt/contaminants per 62,500 miles (100,000 kilometers).

Don't Compromise On Air Filtration

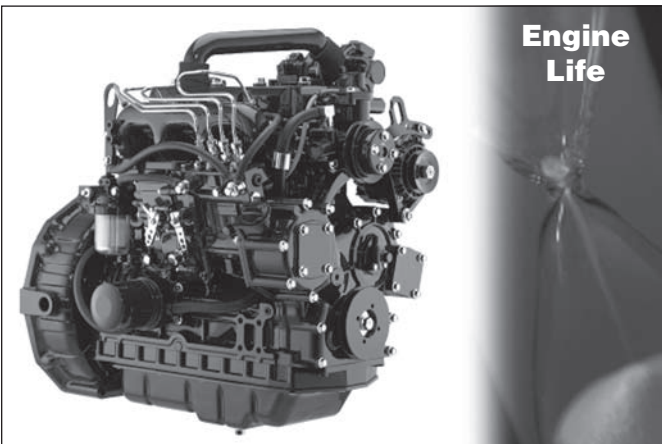
There is no room for compromise. The air intake is an open loop system, and the air filter only has one opportunity to filter the contaminant out of the intake air. Air filters are essential for heavy duty diesel engines, and the air that these engines 'breathe' needs to be as clean as possible. Poor air quality will significantly impact the performance of a diesel engine. Plugged air filters reduce engine performance, create higher fuel consumption, increase exhaust fumes and are harmful to the environment. Fleetguard® air filters are engineered to deliver optimized air quality and provide the best overall performance and service life. To properly perform its function of reducing wear and extending engine life, the air filter must filter 100% of the pre-combustion air and remove as much contaminant of any and every particle size as it can to a very high final efficiency. Sooner or later, the choice of the right filter for the right application can make a substantial difference in wear rate, cost and performance of your diesel engine.



From Pre-Cleaning to OptiAir™



With a range of over 1,500 different air filtration products from clamps to air housings to "state-of-the-art" air filters, Fleetguard Heavy Duty Air Filtration, covers all the needs for your sophisticated air intake systems. Fleetguard Visibowl™ Pre-Cleaners and highly efficient Sy-Klone™ self cleaning Pre-cleaners are strongly recommended for construction, mining, farming, forestry and other segments where operating conditions are severe. For best preventive maintenance practice and to automatically monitor the performance of your air filter, use Fleetguard Restriction indicators. Fleetguard products are engineered to provide the best overall performance and service life. They are the ideal solution in terms of better engine protection, extended service intervals and lower maintenance cost. Our media technology is designed to meet technical specifications including fiber size, shape, pore size, paper thickness and mechanical strength. Fleetguard LIPS (Lenticular Integral Pleat Spacing) ensures that pleats are evenly spaced and that the air spreads equally throughout the surface to maximize filter capacity and life. Special resins impregnated in the media provide maximum performance. Hot melt bonding ensures proper alignment and protection of pleats throughout filter life.



Air Cleaner Housings

Fleetguard® air housings, air cleaners and intake components meet the needs of over 200 Original Equipment Manufacturers (OEM). Fleetguard leads the way in air filtration technology through state-of-the-art design and manufacturing capabilities worldwide. We have the experience and technical expertise to design air filtration systems that exceed application requirements and maximize system potential.

Fleetguard manufacturing facilities around the world produce air filtration systems and are QS 9000, ISO 9001 and/or TS16949 certified. All performance data displayed in this section is based on ISO 5011/SAE J726 standards.



Fleetguard products are used in a wide variety of markets, including:

- On-Highway - Heavy and Medium Duty Trucks
- Construction and Mining
- Agriculture
- Marine
- Industrial



Determine the Requirements

- Establish the air flow required
 - Refer to engine data sheet or contact engine manufacturer
 - Calculate from the available engine data using the formula below
- Establish the maximum allowable initial restriction
 - Refer to engine data sheet or contact engine manufacturer
 - If no information is available, use the 150 mm H₂O, 1.5 kPa or 6" H₂O rule of thumb as a guide

Determine the Class of Air Cleaner: If in doubt always over-specify

- What type of application/ environment will it operate in?
 - Light duty (single stage air cleaner)
 - On highway, inside/outside use with clean air
 - Medium duty (2 stage air cleaner)
 - On/off highway, inside/outside use with dust in the air
 - Heavy duty (2 stage air cleaner with safety element)
 - Off road equipment with heavy dust in the air

Select an Appropriate Air Cleaner

- Examine the flow versus restriction curves to determine the restriction at your given flow rate
- Check the dimensional data to ensure it will fit the customers application
- Overall size
- Inlet and outlet size and positioning

Determine the Accessories Needed

- Mounting bracket(s)
- Weather hood
- Restriction Indicator
- Sy-Klone™ pre-cleaner
- Rubber elbows, hump hoses and hose clamps etc.

Air Flow Calculation Formula

$$\text{Metric: Air flow in m}^3/\text{min} = \frac{\text{swept volume}^1 (\text{liters}) \times \text{speed}^2 \times \text{VE}^3 \times \text{PF}^4}{1000 \times \text{CF}}$$

¹ engine displacement in liters; ² maximum engine RPM; ³ Volumetric Efficiency; ⁴ Pulsation factor

$$\text{Imperial: Air flow in CFM} = \frac{\text{swept volume}^5 (\text{CID}) \times \text{speed}^2 \times \text{VE}^3 \times \text{PF}^4}{1278 \times \text{CF}}$$

⁵ engine displacement in **cubic inches**; ² maximum engine RPM; ³ Volumetric Efficiency; ⁴ Pulsation factor

Volumetric Efficiency (VE)

- VE = can be greater than >2 for very new engine designs
- VE = 1.3 to 1.8 for 4 stroke engine with turbocharger
- VE = 0.85 for 4 stroke engine that is naturally aspirated
- VE = 1.4 for 2 stroke (cycle) engine with Roots-Compressor (blower)
- VE = 1.9 for 2 stroke (cycle) engine with Turbocharger

Cycle Factor (CF)

- CF = 2 for a four stroke (cycle) engine
- CF = 1 for a 2 stroke (cycle) engine

Pulsation Factor (PF) - only applies to engines that are *both naturally aspirated and having 3 cylinders or less*

- PF = 4 if only 1 cylinder
- PF = 2 for two cylinders
- PF = 1.33 for three cylinders

Air Cleaner Selection Chart

Standard Line Medium and Heavy Duty Air Cleaner Selection Chart

