

The Importance of Cabin Air Filters

Today's heavy-duty vehicles encounter many environmental challenges while on the road, including the level of air quality inside the cabin

By **John Gaither, PE, Luber-finer®**, FRAM Filtration



Introduction

At a time when so much media attention is being spent on the issue of increased safety and distracted drivers on the road, something as seemingly innocuous as a cabin air filter might seem of little concern for an over-the-road driver.

While a cell phone or other smart devices are well-known distractions for drivers, those are voluntary choices made by the operator of the vehicle. A driver who is dealing with the symptoms of allergies can just as easily succumb to distractions caused by sneezing, blurry vision and headaches brought on by unclean air entering the cabin compartment.

The world outside a cabin is a far cry from being a perfect environmental setting. From the dust and debris kicked up on the roadways to the pollen, mold and seasonal elements that can trigger allergic symptoms, to the exhaust and soot in the air surrounding any construction or mining operation, the driver is under constant assault. That makes the cabin air filter a front line of defense for the driver as he copes with the outside elements that may enter the cab of his heavy-duty vehicle.

The Challenge

As many as one-in-six Americans currently suffer from asthma or some type of allergy caused by airborne contaminants. These conditions can be magnified when traveling in the cabin of a vehicle that does not have proper air circulation or appropriate filtration.

Whether it is simply incoming fresh air, or air entering the cabin during the use of the heating, ventilation and air-conditioning system (HVAC), the environment inside the cabin of a heavy duty vehicle is subjected to assault from exhaust gases, pollen, bacteria, dirt, dust and soot. Any one of these contaminants may cause an allergic or adverse reaction with the driver. In addition to the general air quality, a poorly ventilated cabin can also become covered in a fine layer of dust as the contaminants in the cabin settle on all the surfaces, which allows the contaminants to remain in the cabin even longer.

Delivering a barrier from the wind, road noise, extreme temperatures and harsh rays of the sun, the cabin of a vehicle may offer the false impression it is shielding the driver and occupants from the hazards of the surrounding environment. A cabin air filter will provide the operating cabin space of a vehicle with a filtering barrier, much like the barrier provided by heating and air conditioning filters in a home.

Today, there is an increasingly growing focus on the health of the operator in the cabin. According to Michael Herald, Director of PC Engineering for FRAM Filtration, "It was about 1995 that the big push came in the United States for heavy duty cabin air filters. It started in Europe first and was adopted by the U.S. later."

The basic function of the cabin air filter remains the same as it was more than 15 years ago, but today's cabin air filters are more technologically advanced than those original filters. Located in the HVAC system of a vehicle, most cabin air filters are found at the outside air intake, where outside air goes through the filter before it comes into the cabin.

According to Gary Bilski, Chief Engineer for FRAM Filtration, many cabin air filters are capable of filtering outside air only. Having the cabin on "recirculation" mode may retard some outside odors, he said, but in the U.S., a small percentage of recirculated air is actually outside air, which does not get filtered in the "recirculation" mode.

"Bottom line is—the cabin air filter is going to filter outside air that you are going to breathe inside the cabin," said Bilski.

The increased awareness of allergy-sensitive people living in the U.S., which according to the Filter Manufacturers Council is estimated at more than 40 million, may be the single-biggest reason for the cabin air filter getting so much recent attention. When you look at the opportunity for a front line of defense for occupants of the cabin, a functioning standard cabin air filter can remove up to 98% of (5-100 micron) particles before anyone ever breathes them.

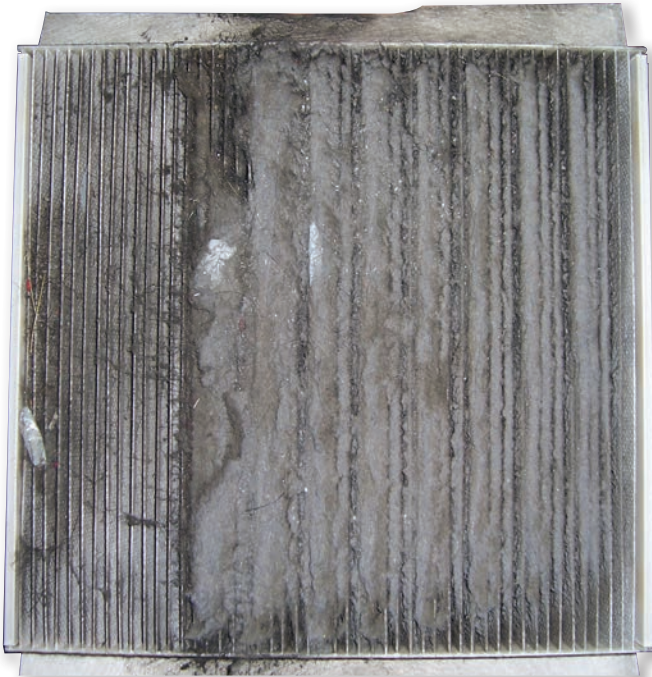
Heavy-duty equipment operators and long-haul drivers are often in their cabins for extensive periods of time

with short periods of time spent outside surrounded by additional equipment generating exhaust and kicking up dust contaminants. This makes them especially vulnerable to the adverse effects of dirty cabin air. When you consider many drivers also sleep in their cabin space, the need to offer a barrier of protection is as much about the cabin comfort and controlling unwanted odors as it is about the driver's overall health.



For the over-the-road vehicle, the typical signs that the cabin air filter may have become saturated with contaminants or plugged with debris can be seen in the volume of air flow being delivered throughout a cab. Windows that easily fog up and are hard to defrost, can often be a first sign of potential filter saturation. In addition to contaminated air, cabin air filters that are plugged and have become moist may create an environment that encourages the growth of mildew and odors.

No matter who manufactures a cabin air filter, every filter eventually needs to be changed, said Bilski. It is important to change a filter every 12,000 to 15,000 miles, or according to the original manufacturer's recommendations. The good thing is that replacing a heavy-duty cabin air filter is a job that does not require hours—but only a matter of minutes. "Most cabin air filters can be changed in 15 minutes or less," Bilski said.



Old Cabin Air Filter at 120,000 miles



New Cabin Air Filter takes less than 15 minutes to install and has a 12,000 to 15,000-mile recommended change interval.



The Solution

In heavy-duty truck and equipment applications, cabin air filters should be replaced according to the guidelines in the owner's manual, though it may be most efficient to change the filters on a seasonal basis because of the pollutants that are prevalent in different seasons.

The new Luber-finer® Extreme Clean HD™ Premium Cabin Air Filter provides the necessary filtration and barrier to the outside contaminants that can invade a cabin and affect its occupants. Designed to remove sub-micron and micron-sized particles, including dust and pollen particles ranging in size from 5 to 100 microns, the Extreme Clean HD™ Premium Cabin Air Filter can effectively filter many of these contaminants.

Bilski said the Luber-finer® Extreme Clean HD™ Premium Cabin Air Filters are uniquely designed to each manufacturer's application. "We have benchmarked our filters for 98.% efficiency and we certainly make sure our fit, form and function meet (original equipment) requirements," he said.

"The Luber-finer® Extreme Clean HD™ Premium Cabin Air Filter combines carbon and baking soda," said Herald. "The carbon removes volatile organic compounds, such as gas fumes and hydrocarbons, while the baking soda removes a range of other offensive odors. Arm & Hammer tested for three specific odors—body odor, wet dog odor, and the pungent smell of mildew," he said.

"Arm & Hammer did this testing. They took their expert sniffers and put the Luber-finer filter over the odors and rated the smell," Herald said. "Nobody in the market is offering this (baking soda treatment) and it gives Extreme Clean a significant advantage over filters not using carbon or baking soda."

Cabin Air Filter Facts

- In most cases, heavy-duty cabin air filter replacement is a job that can be handled in less than 15 minutes.
- According to the Filter Manufacturers Council, more than 40 million Americans are affected by allergies in the U.S. A driver suffering from allergies will notice the impact a clean cabin air filter has on the cabin air and the effect the symptoms have on their comfort.
- A cabin air filter helps provide a steady source of clean air to the cabin. If a cabin air filter becomes saturated with debris, it will impede fresh air from getting into the vehicle.
- Roadside air contains significant numbers of contaminants, such as pollen, dust, diesel soot and smog. These contaminants are two-to-six times more concentrated inside the cab than outside.
- A steady air flow that contains no odor is not a reliable measure of whether a heavy-duty vehicle is ready for a new cabin air filter, which should be replaced every 12,000 to 15,000 miles or according to the manufacturer's recommendations.
- A quality cabin air filter is capable of filtering out sub-micron and micron-sized particles, including dust and pollen particles ranging in size from 5 to 100 microns. The Luber-finer® Extreme Clean HD™ Premium Cabin Air Filter can filter 98% of these contaminants.

Conclusion

The heavy-duty cabin air filter helps the occupants of the truck cab breathe clean air. A clogged or saturated filter will impede air flow volume, as well as the overall quality of air entering the cabin. Roadside air contains significant numbers of particulates such as pollen, dust, diesel soot and smog, and these contaminants can be two-to-six times more concentrated inside the cabin space. This can affect the driver's health, safety and overall ability to perform at a high level of efficiency.

Luber-finer combines groundbreaking research and development with award-winning manufacturing, marketing and customer support. A trusted name since 1936, Luber-finer has been providing high-efficiency performance filtration in the most demanding work environments. The Luber-finer® Extreme Clean HD™ Premium Cabin Air Filter is designed to keep your vehicles and equipment running cleaner, longer. Whether it is preventing harmful contaminants from entering the cabin or cleaning the air of unwanted odors, cabin air filters can be the front line of defense in making the over-the-road trip a safer, more productive mission.

About the Author:

John Gaither is the Director of Heavy-Duty Engineering for FRAM Filtration.

FRAM Filtration is one of the world's largest suppliers of filters and filtration products. FRAM Filtration supplies products through industry-leading brands such as FRAM®, Luber-finer® and PetroClear®. Through its brands, FRAM Filtration serves the automotive, heavy duty trucking and several industrial markets. The company operates through a global network of manufacturing facilities, distribution centers and offices located throughout the United States, Canada, Mexico, Europe and China. For more on FRAM Filtration, please go to www.fram-filtration.com.

Learn how to replace a cabin air filter and more product information at www.luberfiner.com/extremeclean or use this QR code on your mobile device.



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