

Filtration for Heavy-Duty Mining Equipment

The North American mining industry, one of the world's most important, requires reliable equipment in order to satisfy strict production demands

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Introduction

It is a given that nearly every single product anyone comes into contact with during the course of a day contains some sort of mined material. There is also a better-than-average likelihood those that mined materials—from soda ash to copper, gold to crushed stone—were produced in either the United States or Canada.

In fact, the U.S. stands proudly as the world's leading mining nation, with the capability to support production of all mined materials from silver and coal to molybdenum and zinc, with the small exception of titanium and manganese. A similar story is being written across the border in Canada, with that country termed “a global mining giant” thanks to its ability to comfortably produce more than 60 mined materials and metals, including such key commodities as aluminum, diamonds, iron and steel, uranium, potash and sulfur.

The ability to produce these sought-after commodities in large quantities makes the U.S. and Canada indispensable players in the multi-billion-dollar global mining industry. In the U.S., the National Mining Association posted an “optimistic” rating for the industry in 2013, buoyed

by an increase in global demand for coal and other natural resources, and promising growth in the country's construction, housing and automobile industries. In Canada, the country consistently ranks among the world's top-five producers of any number of mined commodities, including potash, diamonds, cobalt, aluminum, uranium and tungsten, which bodes well for the future of the Canadian mining industry.

The breadth and depth of the U.S. and Canadian mining industries has far-reaching effects on a wide range of ancillary industries. Some of the most prominent industries affected are the heavy-duty vehicles and equipment that dig the mines, recover the produced mineral or metal, and transport the recovered commodities for refinement and distribution. These vehicles and equipment can cost millions of dollars, meaning that any downtime due to operational failure will not only adversely affect production schedules, but also lead to massive maintenance bills. This white paper will focus on how knowing and choosing the proper filtration products for a mining operation's heavy-duty rolling fleet and production equipment will keep those critical components operating properly and at their utmost level of efficiency.

The Challenge

According to research done by The Freedonia Group, demand for heavy-duty mining equipment in North America (defined as the U.S., Canada and Mexico) was \$8.4 billion in 2010, but will reach \$11.1 billion by 2015 and nearly \$14 billion by 2020. This demand makes North America the second-largest market for these products, behind only the Asia-Pacific region. North America is also the third-largest producer of mining equipment, trailing Asia-Pacific and Western Europe. In total, world mining equipment demand was \$61.1 billion in 2010 with predicted growth to \$92 billion in 2015 and \$130 billion in 2020.

Therefore, outfitting a mining site with the proper amount and types of heavy-duty equipment can be a daunting task. Here is just a short list of the types of vehicles and production equipment that may be found in and around a mining site:

- Large Bulldozers
- Large Excavators
- Core Drilling Rigs
- Service Trucks
- Road Graders
- Power Generators
- Dragline Excavators
- Wheel Loaders
- Transport Trucks
- Passenger Buses
- Light-Duty Trucks
- Forklifts
- Tire Handlers
- Fuel Trucks
- Dry-Bulk Tankers
- Forced Air Heaters



In an industry this cost- and production-intensive, keeping the equipment operating is a front-of-mind worry for mine operators every day of the 24/7/365 production cycle. Maintenance is such a top priority that some large U.S. mining operations budget upwards of \$75 million a year for equipment maintenance alone. Within that budget, a fleet of 30 haul trucks, for example, can require more than \$300,000 worth of filtration products per year, with those filters stacked 20 or 30 feet high in on-site warehouses.

Keep in mind, these are not the filters you see taken off your automobile when it receives an oil change. A large heavy-duty mining vehicle will feature rows of filters lined up in parallel. On a large, 50-plus-liter industrial engine that might have four turbochargers, each of those turbochargers will require one or two air filters. The fuel, oil and hydraulics side might require another 20 filters.



Some large U.S. mining operations may budget upwards of \$75 million a year for equipment maintenance, with filter maintenance being a sizable portion.

Making sure you have the correct amount of filters on hand is just one area of concern. The filters' ability to operate effectively and efficiently is the main concern, while realizing that most mining operations occur in severe weather conditions with huge amounts of airborne contaminants assaulting the vehicle or the equipment's operating systems on a daily basis. This makes the filter media and premium sealing surfaces very important when trapping those airborne contaminants.

As the vehicle moves across uneven terrain, the gasket seals are critical in addressing vibrational issues, as well as the overall dynamics of operation. Severe-duty conditions also mean the filters must be properly designed to withstand high-stress loading. Filter performance and durability are only achieved by proper design and testing upfront.

Because of the cost of heavy-duty mining equipment, plus the stress it is put under by a round-the-clock operating schedule and trying operating conditions, most mining equipment totals 500 hours of operation before it undergoes a preventive maintenance checkup. At that rate, the equipment is subject to a preventative maintenance procedure once every three weeks. Most mine operators will also perform regular oil analysis of their mining vehicles once every 11 days.

The Solution

So, not only are there large numbers of vehicles and equipment involved in a mining operation, which take place in extremely challenging conditions, but the regular preventative maintenance (PM) checkups require a huge amount of filters to keep those vehicles operating efficiently and reliably. Since 1936, Luber-finer®, which became a brand within the FRAM Filtration family in 2012, has been providing premium filtration solutions for the types of heavy-duty vehicles and equipment that inhabit a mining site. Specifically, Luber-finer has developed lines of oil, air, fuel, cabin air, hydraulic and coolant filter technologies that can help optimize vehicle and equipment performance and uptime in severe-duty mining operations. These filter models include:

- **Imperial XL Oil/Lube Filters:** The Imperial XL filter line features Luber-finer's LH 60 filter media, which has been designed to keep oil flowing smoothly across the media while delivering extremely high filter efficiency over a longer time period. The higher filtering efficiency means fewer contaminants will pass through the filter media, resulting in longer life and more reliable performance. Imperial XL filters also have greater contaminant-holding capacity than standard cellulose-based filters. Standard-setting features of Imperial XL filters include 100% synthetic filter media reinforced by woven wire screen, a steel or nylon center tube, coil spring (if required), heavy-duty metal shell, heavy-duty metal end caps, a heavy-duty threaded base plate and high-strength gasket.
- **MXM™ Force Air Filters:** The MXM Force Air filter line offers Luber-finer's MicroGold Fiber Technology, which delivers maximum capacity, efficiency and performance. The MicroGold Fiber Technology offers higher initial and final efficiency than standard heavy-duty air filters and a high level of contaminant-holding capacity. MXM Force Air filters allow the engine to breathe easier. The filters also offer more pleats than competitive models, which leads to added protection for sensitive engine components. The pleats also have special stabilizer locks and adhesive beads that prevent pleat movement and potential filter collapse.
- **TotalTec™ Fuel Filters:** TotalTec Fuel filters have been designed to provide efficient fuel filtration thanks to a durable, leak-proof method of construction that reduces the risk of failure due to cracks and breakage. The filters are easier and less messy to install because they do not have a plastic bowl that needs to be replaced, which eliminates the need to order and stock separate filters and plastic bowl add-on components. Luber-finer is in the process of enhancing its heavy-duty fuel filter offering with the ongoing development of an Imperial XL Fuel Filter.

This filter is being engineered to offer even higher efficiency and will be more adept at removing emulsified water from the fuel stream.

- **Extreme Clean HD™ Premium Cabin Air Filters:** The newest line of Luber-finer cabin air filters combines carbon and baking soda in the filtering media. The base media removes dust, pollen and other dangerous airborne contaminants and the carbon and baking soda entrap a wide variety of volatile organic compounds, such as gas fumes and hydrocarbons, along with odors from the cabin. The filters have been designed to remove particles that range from 5 to 100 microns.
- **Hydraulic Filters:** These filters have been engineered to combat the demands that are put on today's more sophisticated hydraulic systems. Efficient hydraulic system filtration reduces wear, guards against system failure, and promotes maximum equipment uptime and performance. The LH 60 Synthetic Media has been designed to remove up to 99% of harmful particles and contaminants.

“Conventional” and “Control Release”

Coolant Filters: Luber-finer cooling system filters have been designed to prevent rust, dirt, scale and other contaminants from creating “hot spots” that can damage delicate engine components. The Conventional SCA Coolant Filters maintain and protect cooling systems during recommended service intervals. Controlled Release Technology SCA Coolant Filters protect against corrosion, cavitation and scale for up to four times the engine hours.



A mining site is a harsh environment for any heavy-duty equipment and maintaining regular filter maintenance intervals is key to keeping production moving.

All Luber-finer heavy-duty filtration products take advantage of extensive research and development operations that are performed by the brand's dedicated team of filtration-industry experts. That means no matter what filter is chosen from Luber-finer's range of oil, air, fuel, cabin air, hydraulic or coolant products, mining operators can count on high performance and top-of-the-line reliability for their vehicle and equipment fleet.

Conclusion

The robust nature of the U.S. and Canadian mining markets is the result of many different entities working in concert to deliver required—and desired—results. Heavy-duty vehicles and equipment are one of the key cogs in a mining operation's success, but only if said equipment is capable of meeting the operational needs required. Helping the equipment overcome the challenges of demanding operations are the filters that are used to keep the vehicle or equipment's oil, engine air, fuel, cabin air, hydraulic system and cooling system clean. For nearly eight decades, Luber-finer has stood ready with filtering technology that takes into account the environmental and operational demands of a mining operation, all with the end goal of providing the most reliable filters for all crucial applications within the performance of a myriad of heavy-duty mining vehicles and equipment.



The dusty air filled with diesel exhaust and airborne soot that surrounds any mining operation requires filtration to keep equipment and operators safe and in top operating condition.

To learn more about Mining or how Luber-finer can help you with the challenges of the Mining Industry visit us, please visit www.luberfinermining.com



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About the Author:

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