ValueSpares

New MTU Fuel Filtration Upgrade Kit ensures optimal performance in the field—even when fuel quality standards are difficult or impossible to meet.

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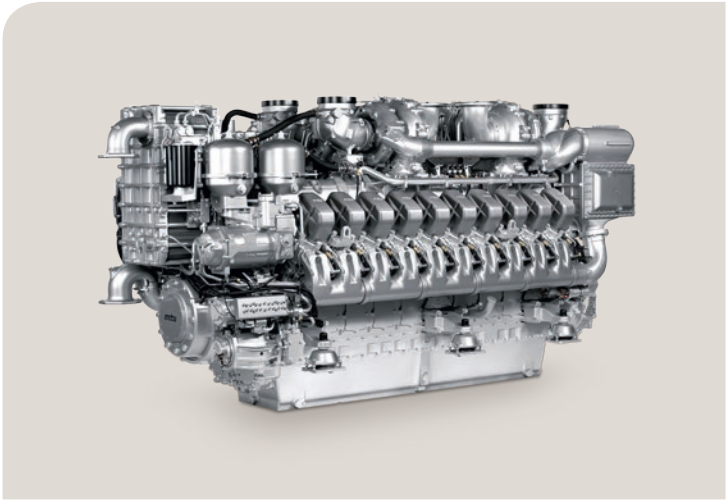
Common rail fuel injection systems require high fuel quality to perform optimally. In a dusty environment such as a mining site, these fuel standards can be difficult or impossible to meet. Over time, particles and contaminants accumulate in the fuel, which can cause premature wear and reduce injector life due to the high pressures in the fuel injection system. To ensure optimal performance in these circumstances, MTU has introduced a new fuel filtration upgrade kit for Series 4000 mining engines. Field-tested for more than three years, it has been shown to significantly extend injector life, which reduces operating costs dramatically. The savings can quickly add up over time, especially for mine operations with large fleets of haul trucks.

The challenge of meeting high fuel standards

With the introduction of the Series 4000 engine in 1996, MTU became the first manufacturer of large diesel engines with common rail fuel injection as a standard feature. Since then, MTU has advanced the technology, optimizing the combustion process to further reduce emissions and fuel consumption.

During the past two decades, MTU has steadily increased injection pressures, which has a significant influence on particulate emission levels. Injection pressure on the first Series 4000 engines was approximately 13,000 psi.



The high injection pressure and performance of modern engines like the MTU Series 4000 yield many benefits, but also require a higher standard of fuel purity and quality.

Today, they have injection pressures of more than 36,000 psi. The higher the injection pressure, the better the fuel atomizes during injection and mixes with the oxygen in the cylinder. This results in a virtually complete combustion of the fuel with high-energy conversion, during which only minimal amounts of particulates are formed.

However, higher technical performance levels require higher demands placed on the fuel in terms of purity and quality. The fuel must comply with pre-defined values for viscosity and lubricity, as the fuel lubricates components of the high-pressure pumps and injectors. It must also be free of any contamination that would lead to abrasive damage at the high injection pressures employed.

At a mining site, the constant cycle of excavation, hauling and blasting generates large amounts of dust. With high levels of dust exposure over extended periods of time, it is inevitable that particles and contaminants will become present in the fuel. For engines with common rail fuel injection, alleviating contamination is critical.

New fuel filtration upgrade kit system designed for dusty environments

To ensure reliable performance for Series 4000 mining engines operating in harsh conditions where fuel standards are difficult to uphold, MTU engineers designed a new upgrade to the fuel filtration system. The goal was to improve the system's ability to remove particle contaminants in the fuel before they reach the injection system and cause damage.

The first aspect of the upgrade involves replacing the filter elements within the primary and secondary filtration unit with new MTU high-efficiency filtration elements. This ensures that filtered fuel meets the standards required by the Series 4000's common rail injection system. To achieve such high efficiency, the filter elements are embedded with extremely fine glass fibers, which enable a very high separation with maximum dirt holding capacity. The MTU High Performance Fuel Filtration kit includes two primary and two secondary filter elements. Additional single spare elements can also be ordered.

The new filters are designed to have similar change-out intervals as the original filters. In extreme conditions, a significant increase in filtration is often accompanied by a reduction in filter lifetime within the primary and/or pre-filtration system. To compensate for these reductions, MTU developed additional upgrades for both pre- and primary filtration units. These optional upgrades increase filtration capacity by adding duplex units into the system, thereby extending filter life:

- The MTU Duplex Primary Filtration Kit includes filter head, fittings (standard and metric) and MTU high-efficiency filter elements (including two spare elements)
- The MTU Duplex Pre Filtration Kit includes filter head, fittings (standard and metric) and filter elements (including one spare element)

The MTU Fuel Filtration Upgrades are available individually or as an all-inclusive kit that combines the MTU Fuel Filtration Upgrade Kit, MTU Duplex Primary Filtration Kit and MTU Duplex Pre Filtration Kit into one complete package.

Field-testing the upgrade at three mine sites

To test the MTU Fuel Filtration Upgrade Kit, prototypes were installed in 20V 4000 MTU engines in massive Liebherr T-282 mine haul trucks, capable of 360-ton payloads, and monitored at three mine sites: North Antelope Rochelle Mine (Wyoming, U.S.), Kaltim Prima Coal (Indonesia) and Mount Arthur Coal (Australia). As a benchmark, a standard fuel filter was installed in a similar truck at each site. Both trucks at each site endured a full 7,000 hours of operation under the same conditions.

Test results validate upgrade and prove extended injector life

After the testing period, all the injectors were inspected and the results showed the new filtration offered significant improvements. Injectors showed less wear at 7,000 hours than at 3,000 hours with the original filtration system. Most cases showed a 50 to 60 percent improvement in longevity. In some cases, injector life was doubled.

Removing the necessity of an injector change just once over the lifetime of an engine offers significant savings. In harsh conditions, several changes can be avoided. With the high-efficiency fuel filtration upgrade kit, reaching the expected life of the injector components is possible, even when fuel quality standards are difficult or impossible to meet. In addition, fuel efficiency is improved and the risks of engine damage by worn injectors and other components are minimized.

Savings can accumulate even more with large fleets. For example, if an engine has a 30,000-hour TBO (time between overhaul), previously it may have required three injector changes per engine lifecycle. With the new upgrade kit, fewer injector changes are needed, which translates to significant cost savings. For an engine equipped with 20 injectors, a complete changeover would typically cost tens of thousands of dollars.

The MTU Fuel Filtration Upgrade Kit has completed its testing period and is now available to MTU customers worldwide.

A success for first customer in extreme conditions

One of the first mine operations to choose the new upgrade kit is the Radomiro Tomic copper mine in Chile, one of the most challenging sites in the world to meet stringent fuel standards. Located 9,800 feet above sea level, dust is ever-present and fuel must go through multiple transfers on its long trek to the site. Previously, injectors achieved nearly 4,000 hours of life. With the installation of the new upgrade, they are now achieving more than 8,000 hours.

Unexpected equipment downtime has been dramatically reduced as well. In addition to solving the problems associated with fuel contamination, the upgrade kit enabled the mine to keep following the same exchange intervals as the previous series production filters. Many haul truck engines at Radomiro Tomic work more than 20 hours a day. Every time equipment is down, it costs the mine operator money. Reducing maintenance time pays off exponentially over time, and across many vehicles in the fleet.

Conclusion

The new MTU Fuel Filtration Upgrade Kit has been proven to improve performance and more than double injector life in Series 4000 mining engines operating in conditions where fuel standards are difficult or impossible to meet. For owners of engines applicable to this upgrade, utilizing the upgrade offers many benefits, including dramatic cost and time savings throughout the lifecycle of their mining equipment.

MTU Fuel Filtration Upgrade Kits are available from authorized MTU distributors. For locations, visit www.mtu-online.com.

At a mining site, dust and dirt are a constant concern. MTU Fuel Filtration Upgrades help minimize the risk better than ever.

MTU Fuel Filtration Upgrade Kit System

Mining – Series 4000

MTU High Performance Fuel Filtration
XP52400600013
This kit includes two primary and two secondary filter elements. Additional single spare elements can also be ordered:

Part No.	Product
X59408300081	1x high efficiency filter element primary
X59408300082	1x high efficiency filter element secondary

MTU Duplex Primary Filtration
XP52400600014
This kit includes filter head, fittings (standard and metric) and MTU high-efficiency filter elements (including two spare elements).

MTU Duplex Pre Filtration
XP52400600016
This kit includes filter head, fittings (standard and metric) and filter elements (including one spare element).

MTU Fuel Filtration Upgrade - All Inclusive
XP52400600017
This comprehensive kit combines pre-filtration, primary and secondary upgrade kits XP52400600013/14/16 into one complete package.

MTU Friedrichshafen GmbH
Part of the Rolls-Royce Group

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The MTU brand is part of the Rolls-Royce Group, providing high-speed engines and propulsion systems for marine, rail, power generation, oil and gas, agriculture, mining, construction and industrial, and defense applications. The portfolio is comprised of diesel engines with up to 10,000 kilowatts and gas engines up to 2,530 kilowatts power output. MTU also offers customized electronic monitoring and control systems for its engines and propulsion systems.

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