

Fueling fleet operational efficiency: Proper diesel storage

The value gained from investing in regular fuel storage maintenance should not be overlooked.

Better fuel quality means fleets run more efficiently, which in turn helps a fleet owner's business run smoothly. However, fuel can be easily contaminated if not stored correctly. So, why isn't there more emphasis placed on proper diesel fuel storage?

The average fleet spends between 30 and 40 percent of its maintenance, repair and operations (MRO) budget on fuel, according to [an analysis](#) by the American Transportation Research Institute (ATRI). Yet fuel quality or storage was not listed among the concerns in ATRI's annual [Top 10 Critical Issues in the Trucking Industry](#) report in 2017. Every individual step in the supply chain matters, and proper diesel fuel storage is critical to the performance of a fleet. Otherwise, the fuel supply may fall victim to a variety of common storage problems such as water and particulate, ultimately affecting fleet performance and efficiency.

Fleet owners risk the occurrence of two common storage problems – water and particulate – when the fuel is not stored properly.

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Common storage problem no. 1: Water

The presence of water in tanks is the most common on-site storage issue. However, there are practices to help ensure water contamination and accumulation in storage tanks is minimized.

There are several common causes of water entry into a storage tank. Rain or surface water from a weather event may enter the storage tank through the fill point during a receipt or through intrusion at various points of the tank. Spill buckets surrounding a fill point may contain water and could have been emptied into the storage tank. Tank venting to the atmosphere combined with daily temperature fluctuations can result in condensation that impacts water levels in the fuel tank.

Tanks should be checked for the presence of water through automatic tank gauging equipment or, in absence of such equipment, through daily use of water-finding paste. If automatic tank gauging equipment is used, it is recommended that the equipment be compared at least monthly with a paste measurement to validate it is responding properly. While you should strive for no water contamination, it is recommended that water levels should be no more than one inch in any bulk storage tank.

To keep water levels at a minimum, regular water removal is required. To limit chances of dispensing water, submersible pumps should be set at least 6" above the bottom of the storage tanks. In new tank construction, consider tank slanting so water collects on the opposite end of the submersible pump. Storage tanks should also be kept as full as possible as less air in tanks minimizes water condensation due to tank venting and daily temperature fluctuations. Fleet operators should also visually examine the appearance of the fuel for any haziness or presence of a water layer.

Particulate such as rust or debris can contaminate the fuel



Common storage problem no. 2: Particulate Contamination

Another common storage problem is particulate contamination. Diesel fuel comes into contact with many different surfaces throughout the fuel distribution system, such as the refinery and terminal tanks, pipeline, or service station storage tanks. Debris or rust may be disturbed from surfaces and remain suspended in the fuel or collect in the bottom of a storage tank. This can lead to particulate contamination when fuel is mixed during receipt of a shipment or when dispensed fuel is pulled from the bottom of the storage tank. Over time, the fuel itself may also oxidize and produce particulate.

Filters are necessary to limit particulate from being dispensed from the storage tank. A nominal filter porosity of 10 microns is recommended. To address particulate transfer while also limiting passage of water, particulate filters that include water absorbance capabilities should be used. Monitoring of flow rates through dispensers to indicate dispenser filter plugging and checking fuel filter condition within your fleet should be done at regular intervals to indicate premature filter plugging, which may be a sign of contaminated fuel that has an increased risk of entering your engine. Consider checking the particulate and water loading of your fleet fuel filters at every oil drain interval to ensure optimal operations.

Should contaminated fuel ever reach fleet engines, engine issues like rough idling, poor running or even engine damage may result. To prevent contamination, fleets must proactively maintain their fuel storage tanks to ensure the quality of their diesel fuel to optimize operation of their fleets. Fleets should have a comprehensive maintenance program in place with key measures including; storage tank maintenance and cleaning, filtration maintenance, epoxy lining of storage tanks, and water mitigation.

Regulation

Federal, state and local regulations may apply for fuel storage tanks tank contents, and fuel dispensing equipment. As laws and regulations vary by location, it's important to familiarize yourself with the applicable laws and regulations for where your tank is located.

Over the years, several industry organizations have also published recommended best practices that some fuel handlers have used as guiding principles. The American Petroleum Institute (API), ASTM International, Coordinating Research Council (CRC), and Steel Tank Institute (STI) have all published reports and guidelines that serve as the basis of many current diesel fuel storage practices.



Why it matters

As it stands, diesel fuel storage isn't always top of mind for fleet owners. However, they will begin to recognize the importance of this practice as the auto industry evolves. As vehicle emission requirements become stricter and vehicle durability grows in importance, fuel quality is becoming a greater area of focus.

Overall, fleets should work closely with their diesel fuel supplier to devise a best-in-class maintenance strategy and mitigate degradation across the equipment lifecycle. Freight demands and the continued growth in the transport of goods has never created a better need for proper diesel fuel storage. In fact, the ExxonMobil [2018 Outlook for Energy: A View to 2040](#) expects global transportation-related energy demand will grow 30 percent through 2040, with the largest volume coming from heavy duty vehicle growth. Certain applications, such as mining operations that experience higher levels of dust and dirt on a normal basis, need to be even more aware of potential diesel storage issues. Fleets need to make their dollars go further and keep trucks on the road by ensuring their diesel fuel supply is properly stored to optimize operational effectiveness.