



Technical bulletin

DIESEL FUEL – FLASH POINT

One of the primary differences between diesel fuel and gasoline is the volatility. While gasoline readily vaporizes, diesel fuel has very low vapor pressure. Thus, gasoline is considered “flammable”, while diesel fuel is classified as “combustible”. Flammable liquids are readily ignited with a spark or match, while combustible materials are not as reactive.

Flash Point Properties – At elevated temperatures, diesel fuel will begin to vaporize and become ignitable with an open flame. The lowest temperature at which the vapor will ignite is the fuel’s flash point. Diesel fuel #2 as specified by ASTM D975 has a minimum flash point of 125.6°F. For diesel fuel #1, the minimum flash point is 100°F. (Winter blends of #1 and #2 are allowed to be 100°F minimum as well). If the flash point falls below these values, the fuel becomes potentially unsafe to handle.

Gasoline contamination can materially alter the flash point of diesel fuel without creating operational issues with the engine. A low flash point in diesel fuel can pose a safety risk to the user due to increased flammability. In particular, exposure to an ignition source can cause a low flash diesel to ignite or explode.

Switch Loading – Switch loading occurs when a transport truck changes a compartment from gasoline to diesel fuel (or vice versa). Often, a truck will have four compartments. When a delivery of all gasoline is made, all four compartments are used. If the next delivery contains diesel fuel, it will be loaded in a compartment that previously held gasoline. If there is no flushing or cleaning between loads, a small amount of gasoline may cling to the hose and walls of the compartment. This gasoline may lower the flash point of the subsequent diesel fuel. If more than a few gallons of residual gasoline mixes with the diesel fuel, the flash point of the fuel may be decreased enough to be off-specification. We recommend the gasoline be allowed to fully drain and the corrugated hose be lifted (i.e.: walking the hose) to minimize the amount of gasoline left behind in the compartment. Extra care when switch loading will help prevent low flash diesel issues.

Cross Contamination – Cross contamination in the underground storage tanks may also impact diesel flash point. If an underground storage tank in gasoline service is converted to diesel fuel service without first completely pumping out the gasoline, diesel deposited in the tank may exhibit a lower flash point.

Common Vent Lines – If vent lines shared between tanks have not been properly disconnected, flash point failures can occur. These lines allow vapors to travel from tank to tank, and in some cases, liquid fuel can splash over during a delivery. Even the gasoline vapors themselves can be an issue in the winter as they can condense on cool piping and fall back into the diesel. These common vent lines must be completely disconnected. Even when each tank appears to have a separate vent line, the lines may be tied together underground. A tank pressure test may be necessary to verify the vent lines are not shared.

Additionally, Stage I and Stage II vapor recovery lines need to be disconnected if they were shared between gasoline tanks. Some sites may have Stage II lines in place even if the site was not in a Stage II area. As a proactive measure, some sites installed these lines during the initial build in anticipation of becoming a nonattainment area. Thus, sites should check for this issue even if they are not located in a Stage II area.

Remediation – Low flash diesel can be remediated if the flash point is not too low. A good break point for this is about 100°F for diesel #2. If the retail tank is at 100°F and the incoming fuel from the terminal is 135°F, at least a 5:1 drop of on-spec diesel to low-flash diesel may be necessary to bring the inventory above 125.6°F. If the retail tank has a flash point below 100°F, a pump out of the tank may be more practical.

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