

Automatic Mechanical Line Leak Detectors (MLLD) – Part I

In this installment of FAQs from the National Work Group on Leak Detection Evaluations (NWGLDE), we discuss the operation of automatic mechanical line leak detectors (MLLDs) with regard to product type. The next part in this series will address the effects of piping type and installation location on MLLD operations. This article does NOT apply to electronic line leak detectors (ELLD). (Please note: The views expressed in this column represent those of the work group and not necessarily those of any implementing agency.)

Q. Why do some MLLD manufacturers offer MLLDs that are certified for multiproduct (e.g., gasoline, diesel), and others for diesel only?

A. When MLLDs were first introduced (circa 1960), they were not tested to evaluate their performance with different products. At the time, there was only one type of piping in widespread use: galvanized steel. Since 1991, MLLDs have been required to meet the performance standard specified in the U.S. EPA rule—to detect a leak of 3 gph at 10 psi with a minimum 95 percent probability of detection and a maximum 5 percent probability of false alarm. Because of this requirement, some manufacturers introduced MLLDs designed for use with diesel only to more reliably meet this performance criterion.

Q. Can MLLDs be interchanged (e.g., diesel to gasoline or vice versa)?

A. First, let's focus on the function of a MLLD. During the pumping phase, a MLLD detects line leaks by metering the flow into the line through a precisely sized orifice at a flow rate slightly less than the U.S. EPA standard of 3 gph. If this metered flow through the MLLD is greater than any downstream line leak present, the pressure in the line increases and the MLLD opens to full flow. If this metered flow is less than any downstream line leak present, the pressure in the line does not increase, and the MLLD restricts the flow to 3 gpm when a dispenser nozzle is opened. When the flow is restricted, the MLLD is said to have "tripped."

As long as the fuel being metered by the MLLD has the same physical properties as the fuel the MLLD was designed for, the MLLD will be able to properly detect leaks in accordance with the EPA standard. For example, MLLD units designed for use with diesel should be able to detect

leaks in tanks holding fuels with similar characteristics, such as kerosene or jet fuels, because they have similar viscosity signatures. However, if a MLLD unit designed for use with diesel fuel were placed in a gasoline product pipeline, the lower viscosity of the gasoline would cause the MLLD to meter the gasoline into the pipeline at a flow rate *above* the EPA standard, and a 3 gph leak would not be able to be detected.

MLLDs designed for use with gasoline will detect leaks within EPA standards for fuels with thicker viscosity signatures, such as diesel or kerosene, because the fuel will meter through the MLLDs at a flow rate *below* the 3 gph EPA standard. This means that MLLDs designed for use with gasoline and operating in diesel fuel, will be more sensitive to leaks.

For example, a MLLD designed for diesel and placed in a gasoline system might only be able to detect a 4 or 5 gph leak at 10 psi and would therefore not meet the regulatory requirements for flow rate. Conversely, a MLLD designed for gasoline and placed in a diesel system might be able to detect a leak of 1 or 2 gph at 10 psi, which does meet the regulatory requirements for flow rate, and, in theory at least, be able to detect even smaller leaks in diesel fuel than is required by the EPA standard. Since all MLLDs have the same diameter base and use the same thread, they can be installed for use with inappropriate fuel types.

Therefore, it is important to review the NWGLDE listings to determine what products a MLLD can handle to ensure that it is able to detect a leak within the EPA standard of 3 gph at 10 psi with a minimum 95 percent probability of detection and a maximum 5 percent probability of false alarm. As an inspector, the violation to watch out for would be a diesel MLLD installed on a gasoline storage system.

(To be continued)

About NWGLDE

NWGLDE is an independent work group comprising 10 members, including eight state and two U.S. EPA members. This column provides answers to frequently asked questions (FAQs) NWGLDE receives from regulators and people in the industry on leak detection. If you have questions for the group, please contact them at questions@nwglde.org.

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