



STATE OF WISCONSIN
Department of Agriculture, Trade and Consumer Protection

Approval # 20180005

(Renewal for 20100001)

Bureau of Weights and Measures
Storage Tank Regulation
P.O. Box 7837
Madison, WI 53707-7837

Wisconsin ATCP 93 Material Approval

Equipment: LD-2000, LD-2200, LD-3000 and PLC-5000 Line
Leak Detection Systems

Manufacturer: Vaporless Manufacturing, Inc.
8700 E. Long Mesa Dr.
Prescott Valley, AZ 86314

Expiration of Approval: December 31, 2021

SCOPE OF EVALUATION

The Vaporless LD-2000 series, LD-2200 series, and LD-3000 series mechanical line leak detectors manufactured by Vaporless Manufacturing, Inc., have been evaluated for use as automatic line leak detectors as specified in **s. ATCP 93.515(8)** of the Wisconsin Flammable and Combustible Liquids Code. The Vaporless PLC-5000 Site Controller with the 98LD-2000 line leak detector was evaluated as a line tightness test in accordance with **s. ATCP 93.515(8)**.

This evaluation summary is condensed to provide the specific installation, application and operation parameters necessary to maintain the subject systems in compliance with the Wisconsin Administrative Code – ATCP 93.

DESCRIPTION AND USE

The Vaporless LD-2000 mechanical line leak detection system uses a preset threshold and a single test to determine whether a pipe is leaking. The system declares a leak if a threshold of 2.5 gph is exceeded. The LD-2000 is designated for use with Red Jacket or F.E. Petro pumps. The LD-2000T is a modification of the LD-2000. Modifications were made to allow the unit to be installed on a Tokheim or F.E. Petro pump.

The LD-2000E leak detector is also a modification of the LD-2000 leak detector. The modifications were introduced to specifically improve the performance in lines with physical properties outside the bulk modulus prescribed in the EPA /530/UST-90/010, September 1990 protocol. The original Bulk Modulus certification was 25,000+ or – 10,000 psi. The LD-2000E was certified on 1352 psi. The LD-2000E can be installed on Red Jacket or F.E. Petro pumps. The LD-2000ET is to be installed on Tokheim or F.E. Petro pumps.

The Vaporless LD-3000 was designed for use with larger, rigid and flexible pipeline systems and high capacity submerged pumps (Red Jacket or F.E. Petro).

The Vaporless LD-3000S and LD-2000S are identical in performance to the LD-3000 and LD-2000, except that they are equipped with an automatic pump shutoff feature.

In system operation, when the pump is activated, fuel is metered into the line to raise the pressure. If a leak is present, sufficient pressure cannot be achieved to force the system into its fully open position. Thus, a leak will be indicated by a very slow dispensing rate. The LD-2000S and LD-3000S include a preset switch and a timer. If the line pressure does not rise above 15 psi within a preset time period after activation of the pump, the submerged pump is turned off. When no leak is present, the LD-2000, LD-2000S and LD-2000T open to full flow in less than 5 seconds; the LD-3000 and LD-3000S open to full flow in approximately 9 seconds; and the LD-2000E and LD-2000ET open to full flow in approximately 1 1/2 minutes.

The PLC Site Controller will perform 0.1, 0.2 and 3.0 gallon per hour tests when equipped with the 98 LD-2000 line leak detector. It can also be used with other suitable approved sensors to monitor sumps or double wall tanks. A mechanical leak detector may be included in the PLC Site Controller system. The system prints "pass" or "fail" on the test report. The leak rate in gallons per hour is printed only if the threshold is exceeded. The threshold for declaring a 0.1 gph leak is 0.068 gph. The threshold for declaring a 0.2 gph leak is 0.136 gph. The threshold for declaring a 3.0 gph leak is 2.5 gph. If a leak is declared, automatic submersible pump shutdown, message display, and alarm activation will occur.

The Vaporless 99 series- LD-2000 or LD-3000 mechanical line leak detectors have the ability to use the ISM-4080 or ISM-4081 modules for automatic shutdown of the submersible pump upon leak detection. The ISM is also used to control repressurization of the line. If at any point the line pressure falls below 12 psi during system operation (non-dispensing times); repressurization occurs reducing the effects of thermal or flexible line contraction and their corresponding false alarms. If a passing test is not achieved, the submersible pump will be locked out and alarm activation will occur. The ISM modules can also be used with other suitable approved sensors to monitor sumps or double wall tanks.

TESTS AND RESULTS

The performance of the LD-2000, LD-2200 and LD-3000 series leak detectors was evaluated using the EPA protocol for evaluating pipeline leak detection systems. Additional evaluations were made to verify that the modifications incorporated in models ending with "T" or "S" did not affect the performance of the detectors. Additional evaluations were performed to show that the "99" and "2200" designations did not affect the performance of the detectors. Additional evaluations were performed to show that the ISM-4080 and ISM-4081 did not affect the performance of the mechanical line leak detectors.

All systems are capable of detecting a leak rate of 3 gph at a pipeline pressure of 10 psi with a probability of detection of 100 percent and a probability of false alarm of 0 percent.

The performance of the PLC-5000 system with the 98 LD-2000 line leak detector was evaluated using the EPA protocol for evaluating pipeline leak detection systems - line tightness tests.

LIMITATIONS / CONDITIONS OF APPROVAL

- All monitoring equipment shall be installed, calibrated, operated, and maintained in accordance with the manufacturer instructions, and certified every 12 months for operability, proper operating condition, and proper calibration by inducing a physical line leak. The individual performing the test must be qualified by the equipment manufacturer. Records of sampling, testing, or monitoring shall be maintained in accordance with **ATCP 93.500(9)**.
- The manufacturer shall submit for a revision to this Wisconsin Material Approval application if any of the functional performance capabilities of this equipment are revised. This would include, but not be limited to changes in software, hardware, or methodology.
- The system may be used with trapped vapor present in the line.
- The Vaporless Line Leak Detectors are approved for use on pipeline systems for underground storage tank facilities that contain gasoline, diesel, and aviation fuel. Other products may be tested after consultation with the manufacturer. They are approved for use on rigid, flexible, and combination rigid/flexible piping.
- An annual test of the operation of the leak detector shall be conducted in accordance with the manufacturer requirements for testing to the recognized leak thresholds by inducing a physical line leak as required by **ATCP 93.515(8)(d)2**. The individual performing the test must be qualified by the equipment manufacturer or an individual meeting the requirements of **s. SPS 305.88** for pipe testing.

LD-2000, LD-2200, PLC-5000, LD-3000, LD-3000S Line Leak Detector Systems

- Critical performance parameters for the **LD-2000, LD-2200, and PLC-5000 Line Leak Detector:**

Rigid Piping: (Fiberglass or steel)

Parameter	Value
Total maximum allowable volume of product in any rigid test pipeline	172 gallons or less

Flexible Piping:

Parameter	Value
Total maximum allowable volume of product in any flexible test pipeline	39.5 gallons or less

- Critical performance parameters for the **LD-3000, LD-3000S Line Leak Detector:**

Rigid Piping: (Fiberglass or steel)

Parameter	Value
Total maximum allowable volume of product in any rigid test pipeline	404 gallons or less

Flexible Piping:

Parameter	Value
Total maximum allowable volume of product in any flexible test pipeline	96 gallons or less

Combination Rigid/Flexible:

Parameter	Value
Total maximum allowable volume of product in any combination rigid/flexible test pipeline	500 gallons or less¹

1: The capacity of the flexible component cannot exceed 96 gallons.

This approval will be valid through December 31, 2021, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The Wisconsin Material Approval Number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The Department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement unless specified in this document.

Effective Date: October 15, 2018

Reviewed by:  Date: 10/15/18
Erik Otterson
Environmental Engineering Specialist
Department of Agriculture, Trade, and Consumer Protection

Approved by:  Date: 10/15/18
Greg Bareta, P.E.
Storage Tank Regulation Chief
Department of Agriculture, Trade, and Consumer Protection