Wisconsin
Department of Commerce

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Environmental & Regulatory Services Division
Bureau of Storage Tank Regulation
201 West Washington Avenue
P.O. Box 7837
Madison, WI 53707-7837

Wisconsin COMM 10 Material Approval

Equipment **EECO SYSTEM 1000, 1500, 2000, and 3000; ECCO SYSTEM SLD; TLM, TLM II: Line Leak Detector, Leak Sensor Jr. and Leak Sensor II Leak Detection Equipment**

Manufacturer: **Emco Electronics Division- Tuthill Corporation**
114-300 MacKenan Drive
Cary, NC 27511

Expiration of Approval: **December 31, 2002**

SCOPE OF APPROVAL

The EECO SYSTEM Family Tank Level Monitor (TLM) and TLM II, EECO SYSTEM Series 0.2 gph SLD, and EECO SYSTEM 1000, 1500, 2000, and 3000 were evaluated for use in monthly monitoring in accordance with **s. COMM 10.61 (4)**. The TLM was also evaluated for use as a tank tightness testing method in accordance with **s. COMM 10.61 (3)**. The EECO SYSTEM Family Line Leak Detector was evaluated as a method of release detection for piping in accordance with **ss. COMM 10.615 (1)** to **(3)**. The Leak Sensor

Junior and Leak Sensor II and the EECO SYSTEM Family 1500, 2000, and 3000 Liquid Phase Detectors were evaluated for use as interstitial, sump, pan, and well monitors with the following sensors in accordance with **s. COMM 10.61 (7)**: Q0001-001 Liquid Proximity, Q0001-004 Liquid Thermistor, Q0001-005, Q0003-001, Q0003-002, Q0003-003, Q0003-xx4, Q0003-005, Q0003-006, and Q0003-009.

DESCRIPTION AND USE OF EQUIPMENT

EECO SYSTEM Family components and software are packaged into the following products:

The EECO SYSTEM 1000 series incorporates only the EECO SYSTEM Family TLM and is used for monitoring tanks only.

The EECO SYSTEM 1500 incorporates the TLM and the EECO SYSTEM Leak Sensors to monitor tanks and sumps, pans, and wells.

The EECO SYSTEM 2000 series may include any or all of the following: The EECO SYSTEM Family TLM, the EECO SYSTEM Leak Sensors or the EECO SYSTEM Family Line Leak Detector to monitor tanks, lines, sumps, pans, or wells.

The EECO SYSTEM 3000 series can perform the same monitoring as the EECO SYSTEM 2000 series plus it has a touch screen control panel and printer that is installed remote from the console.

The TLM II, Leak Sensor Jr. and Leak Sensor II are all individually packaged systems.

EECO SYSTEM Family TLM and TLM II

The TLM and TLM II systems detect changes in product volume by detecting changes in the level of a float. The ATG systems detect the presence of water in the bottom of the tank and measure the inflow of water as well as the loss of product.

The EECO SYSTEM Family TLM may be used for tanks containing gasoline, diesel fuel, aviation fuel, #4 fuel oil, solvents, waste oil, and most other liquids that are compatible with the probe. Leak rates are calculated using data determined valid through statistical analysis. Test results are considered to be inconclusive if there is too much variability in the data, excessive temperature changes, or tank wall deformation. Lengthening the stabilization period beyond the minimum time is the only acceptable deviation in the standard test protocol.

The 0.1 “Precision” test, and 0.2 gph monthly test have built-in 6-hour waiting periods after a product drop.

The actual test time will vary with the tank and the amount of product according to a pre-programmed protocol.

The TLM II Model Q0400 may be used for tanks containing gasoline, diesel fuel, aviation fuel, fuel oils #4 and #6, solvents, waste oil, motor oil, antifreeze, brake fluid and transmission fluid.

Leak rates are calculated by the TLM II using two methods: The difference between the first and last data collected; and using data collected over the entire test period. Test results are considered to be inconclusive if there is too much variability in the data, an unexplained volume increase or the two calculated leak rates disagree. The lengthening of the duration of the test beyond the minimum time is the only acceptable deviation in the standard test protocol.

EECO SYSTEM 0.2 gph SLD

The SLD System consists of data hardware and software and a magnetostrictive probe that measures water level, product level and product temperature. The data system collects data during idle times to eliminate the need for downtime and regularly scheduled tank tests. The system merges data from each period with the accumulated data to create a database on which a statistical analysis is performed. When adequate data periods have been collected, the leak rate is calculated and the results are reported.

The SLD System can be used on two tanks that are manifolded together. It can be used with most common petroleum products and other products that are compatible with the probe.

EECO SYSTEM Family Line Leak Detector

The EECO SYSTEM Family Line Leak Detector may be used for lines containing gasoline, diesel fuel, aviation fuel, fuel oil #4 and some other products. The system measures changes in volume at a specific test pressure of 10 psi. The system declares a leak if the output of measurement system exceeds a threshold of 2.0, 0.1293, or 0.0793 gallons per hour for the hourly, monthly or annual test, respectively. The system can be used on pipelines pressurized to 40 psi; 45 psi is the maximum safe operating pressure for the system.

When testing flexible piping, the typical data collection time is at least 8 minutes for the 3.0 gph test and at least 4 hours for the 0.1 gph test.

Liquid-Phase Out-of-Tank Product Detectors

The Leak Sensor Jr., EECO SYSTEM Family, and Leak Sensor II Q0001-004 Liquid Thermistor and Q0001-001 Liquid Proximity probes detect liquid in interstitial spaces

using a measurement principle of a proximity switch. The detectors have 1-second response times and must be reset manually. The lower detection limits of all probes were less than 0.49 inches.

The Q0001-005 and the Q0003 series sensors have a range of response times depending on the type of sensor and the liquid it is immersed in.

The probes were found to respond to commercial gasoline, synthetic gasoline, diesel fuel, Jet-A jet fuel, n-Hexane, Toluene, Xylene and water.

TESTS AND RESULTS

The performance of the EECO SYSTEM Family TLM system was determined in accordance with the EPA testing protocol for automatic tank gauging methods. The 0.1 gph "Precision" test, using a leak declaration of 0.05 gph, showed a probability of detection (P_D) of 95.2% and a probability of false alarm (P_{FA}) of 4.8%. The 0.2 gph monthly test, using a leak declaration threshold of 0.1 gph, showed a P_D of 99.5% and a P_{FA} of 0.5%.

The TLM II, Model Q0400, manufactured by Environment and Safety, Inc., for Emco Electronics, was evaluated by Midwest Research Institute in accordance with the EPA protocol for automatic tank gauging methods. The system was found to have a P_{FA} of 4.6% and a P_D of 95.4% for a 0.2-gallon per hour leak.

The SLD System for continuous tank monitoring was evaluated according to the protocol for Continuous In-Tank Leak Detection Systems. Using a leak declaration threshold of 0.10 gph, the system was capable of detecting a 0.20 gph leak with a probability of detection of 99.48% and a corresponding probability of false alarm of 0.52%. When tested on a system of two tanks manifolded together, the probability of detection was listed as 99.1% and the corresponding probability of false alarm was listed as 0.9%.

The performance of the EECO SYSTEM Family pipeline tester, Version Q0011, was determined using the EPA protocol for evaluation of pipeline leak detection systems. When used as an annual line tightness test, the system is capable of detecting a 0.1-gallon per hour leak, defined at 45 psi, with a P_{FA} of 0% and P_D of 100%.

When used as a monthly monitoring test, the system is capable of detecting a 0.2 gph leak, defined at 30 psi, with a P_{FA} of 0% and a P_D of 100%. When used as an hourly test, the system is capable of detecting a 3 gph leak, defined at 10 psi, with a P_{FA} of 0% and a P_D of 100%.

The performance of the Leak Sensor Jr., EECO SYSTEM Family and Leak Sensor II liquid-phase detection probes were evaluated in accordance with the EPA standard test procedure for liquid-phase out-of-tank product detectors by Ken Wilcox Associates, Inc.

The EPA test procedures used only addressed the issue of the method's ability to detect leaks and not safety hazards.

LIMITATIONS OF APPROVAL

TLM

The tank shall be no larger than 20,000 gallons.

The tank shall be at least 14% full before beginning any test. If the annual tank tightness test is used, the tank shall be at least 95% full, but not overfull before beginning the test.

All procedures specified by Emco Electronics and this approval shall be used to conduct the tests.

TLM II ATG

TLM II is approved for use as an automatic tank gauge in conformance with **s. COMM 10.61 (4)** for tanks no larger than 20,000 gallons.

The procedures specified by Emco Electronics shall be used to conduct all tests.

The difference between the temperature of added product and in-tank product shall be no more than 6.8^{o}F. The tank shall be at least 50% full during the test.

The minimum water level that the ATG can detect is 0.896 inches. The minimum change in water level that can be detected by the ATG is 0.023 inches, provided the water level is above the minimum.

A threshold value of 0.10-gallon per hour shall be used to declare that a tank is leaking.

EECO SYSTEM SLD

The SLD System is approved for use as an automatic tank gauge in conformance with **s. COMM 10.61 (4)** for single tanks or for manifolded systems of two tanks with capacities of up to 35,000 gallons.

The procedures specified by Emco Electronics shall be used to conduct all tests.

The monthly throughput for a single tank or manifolded systems of two tanks shall be no greater than 150,000 gallons.

The allowable product level range in the tank or manifolded system is between 4% and 95% full.

EECO SYSTEM Family Line Leak Detector

EECO SYSTEM Family Line Leak Detector is approved for use in conformance with **s. COMM 10.615 (1), (2)** or **(3)** on pipeline systems constructed of fiberglass, steel, or flexible piping with nominal diameters of less than 3 inches or that have a bulk modulus of at least 1,280 psi.

The operating instructions and test procedures specified by Emco Electronics shall be used to conduct all tests. The leak detection equipment shall not be changed by subsequent modifications. Other mechanical line leak detectors shall be removed from the pipeline.

The volume of product in any pipeline to be tested with the EECO SYSTEM Family Line Leak Detector shall be 68 gallons or less for rigid piping and 50 gallons or less for flexible piping.
The waiting period, between the last delivery of product to the tank or last dispensing of product through the pipeline system and the start of data collection, is determined by system software.

For rigid piping, the total time for data collection shall be at least 1 minute for a 3 gph test. The total data collection time for the 0.2 gph test is 9 to 37 minutes. The total time for data collection for the 0.1 gph test is 31 to 73 minutes.

This test shall not be used if trapped vapor is present in the system. The system checks the pipeline for trapped vapor and alerts the operator to purge the lines of trapped vapor.

Liquid-Phase Out-of-Tank Product Detectors

The Leak Sensor Jr., and Leak Sensor II Q0001-004 Liquid Thermistor and Q0001-001 Liquid Proximity probes, and the EECO SYSTEM Family Q0003-003, Q0003-005, Q0003-006, and Q0003-009 sensors are approved for use as interstitial liquid-phase product monitors in accordance with **s. COMM 10.61 (7)**.

The Q0003-xx4 sensor is approved for use as part of a groundwater monitoring system under **s. COMM 10.61 (6).**

All equipment shall be installed, operated and maintained in accordance with procedures specified by Emco Electronics.

The interstitial probes shall be placed in the lowest point of the interstice and be able to detect a leak in any portion of the primary containment that routinely contains product.

This approval will be valid through December 31, 2002, 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 not specified in this document.

Approval Date: July 11, 2001

Approved by:

Greg Bareta
Mechanical Engineer
Bureau of Storage Tank Regulation