STATE OF WISCONSIN
Department of Agriculture, Trade
and Consumer Protection

Approval# 20220001
(Replaces 20200005R1)

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

Wisconsin ATCP 93
Material Approval

Equipment: TS-504 and TS-508 Inventory Control Systems; EVO 200, EVO 400, EVO 500, EVO 600, EVO 5000, EVO 6000, TS-5,TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, TS-5000 EVO, and Colibri Leak Detection Systems; SCALD (Continuous Automatic Leak Detection System) 2.0 and SCALD 3; TS-LLD and TS-LS500 Line Leak Detection System; SLLD Continuous Pressurized Piping Leak Detection System; TSP and FMP Series Sensors, and TS-SCM Vacuum Monitoring System

Manufacturer: Franklin Fueling Systems
3760 Marsh Rd.
Madison, WI 53718

Expiration of Approval: December 31, 2025

SCOPE OF EVALUATION

The Franklin Fueling Systems EVO 200, EVO 400, EVO 500, EVO 600, EVO 5000, EVO 6000, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS- 2001, TS-5000, TS-5000 EVO Automatic Tank Gauging (ATG) Systems and the TS-SCM Vacuum Monitoring Systems manufactured by Franklin Fueling Systems were evaluated as a means of monthly monitoring in accordance with **s. ATCP 93.510(3)(a)** and **93.515 (5),** and as a means of tank tightness testing in accordance with **s. ATCP 93.515 (4)** of the Wisconsin Flammable and Combustible Liquids Code.

The Franklin Fueling Systems (FFS) Colibri Automatic Tank Gauging (ATG) Systems manufactured by Franklin Fueling Systems were evaluated as a means of monthly monitoring in accordance with **s. ATCP 93.510(3)(a)** and **93.515 (5).**

The Franklin Fueling Systems Statistical Automatic Continuous Leak Detection (SCALD) system was evaluated as a means of continuous statistical leak detection for underground tanks in accordance with **s. ATCP 93.510(3)(a)** and **93.515 (5).**

The Franklin Fueling Systems TS-LLD and TS-LS500 Electronic Line Leak Detection Systems were evaluated as a means of automatic line leak detection and line tightness testing for rigid and flexible piping in accordance with **s. ATCP 93.510(4)** and **93.515 (8)**. The TS-LS500 system was also evaluated for use in semi-rigid (FFS UPP pipe) and hybrid systems containing rigid and flexible piping.

The Franklin Fueling Systems TS-LS500 SLLD Continuous Pressurized Piping Leak Detection System was evaluated as a means of line monthly monitoring testing for rigid and flexible piping in accordance with **s. ATCP 93.510(4)** and **93.515 (8)**. The TS-LS500 SLLD Continuous Pressurized Piping Leak Detection System was also evaluated for use in hybrid systems containing rigid and flexible piping.

Franklin Fueling Systems sensor models TSP-EIS, TSP-ULS, TSP-DIS, TSP-DDS, TSP-DTS, and TSP-HIS were evaluated as a means of interstitial and/or containment sump monitoring in accordance with **s. ATCP 93.510(3)(a), 93.510(4)(a)3,** and **93.515 (7).** Franklin Fueling Systems sensor model TSP-HLS was evaluated as a high-level overfill protection sensor to be installed in accordance with **s. ATCP 93.505(2)(b).**

Franklin Fueling Systems sensor models FMP-ULS, FMP-UHS, FMP-ULS-C, and FMP-ULS-PS were evaluated as a means of interstitial and/or containment sump monitoring in accordance with **s. ATCP 93.510(3)(a), 93.510(4)(a)3,** and **93.515 (7).** Franklin Fueling Systems sensor model FMP-HLS was evaluated as a high-level overfill protection sensor to be installed in accordance with **s. ATCP 93.505(2)(b).**

Franklin Fueling Systems sensor models FMP-EIS-U, FMP-DIS-U, FMP-DDS-U, FMP-DTS-U, and FMP-HIS-U were evaluated as a means of interstitial and/or containment sump monitoring in accordance with **s. ATCP 93.510(3)(a), 93.510(4)(a)3,** and **93.515 (7).**

Franklin Fueling Systems model TS-SCM vacuum monitoring system was evaluated as a means of tank/pipe work interstitial and/or containment sump monitoring in accordance with **s. ATCP 93.510(3)(a), 93.510(4)(a)3,** and **93.515 (7).**

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

DESCRIPTION AND USE

The various Franklin Fueling Systems Tank Sentinel ATG systems, with or without SCALD, may be used on tanks that contain gasoline, diesel, aviation fuel, #4 fuel oil, and some solvents. Other liquids with a known coefficient of expansion and density may be tested after consultation with and approval from Franklin Fueling Systems.

Tank Sentinel Inventory Control System[1]

The Franklin Fueling Systems TS-504 and TS-508 Inventory Control system consist of a console and probe combination that measure inventory levels in underground and aboveground tanks.

The system consists of either the TS-504 or TS-508 console; either the TSP-LL2-NNNI (NNN = shaft length), TSP-LL2 or FMP-LL3 magnetostrictive probe; and the appropriate float for the product type.

[1] The Franklin Fueling Systems TS-504 and TS-508 Inventory Control Systems are approved for use as part of a valid leak detection methodology for UST systems that use either Manual Tank Gauging, Inventory Control, or Statistical Inventory Control (SIR) only. The TS-504 and TS-508 systems are not capable of performing any tank tightness testing.

Due to the variation in liquid levels caused by dynamic environmental conditions that AST's experience, the TS-504 and TS-508 systems are not approved for use as a leak detection methodology for AST's. At the present time, there is no requirement for leak detection systems on AST's, other than interstitial monitoring on double wall tanks

Tank Sentinel and Colibri Leak Detection System

The Franklin Fueling Systems EVO 200, EVO 400, EVO 500, TS-5, TS-550, TS-550 EVO, EVO 600, EVO 5000, EVO 6000, TS-750, TS-1000, TS-1001, TS- 2001, TS-5000, TS-5000 EVO, and Colibri Automatic Tank Gauging (ATG) Systems consist of a console and probe combination that can be used as either a monthly monitoring or tightness testing leak detection system in underground tanks. The ATG probe is a magnetostrictive probe that senses the liquid level. Each probe has temperature sensors that are used to correct the volumetric level reading for temperature effects. Each probe contains a water sensor for the purpose of detecting water ingress with an optional density float available for measuring product density and mass calculation.

The **TS-5,TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, TS-5000 EVO and Colibri** with either the TSP-LL2 or FMP-LL3 magnetostrictive probe **can perform both tightness testing (0.1 gph) and automatic tank gauging (0.2 gph) on tanks with a capacity up to 15,000-gallons.**

The **TS-5,TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, TS-5000 EVO and Colibri** with either the TSP-LL2 or FMP-LL3 magnetostrictive probe **can perform only automatic tank gauging,** not tightness testing**, on tanks with a capacity up to 30,000-gallons.**

The **EVO 200, EVO 400, EVO 500, EVO 600, EVO 5000 and EVO 6000** with the FMP-LL3 magnetostrictive probe **can perform both tightness testing (0.1 gph) and automatic tank gauging (0.2 gph) on tanks with a capacity up to 20,000-gallons.**

The **EVO 200 and EVO 400, EVO 500, EVO 600, EVO 5000 and EVO 6000** with the FMP-LL3 magnetostrictive probe **can perform only automatic tank gauging,** not tightness testing**, on tanks with a capacity up to 30,000-gallons.**

The **FMP-LL3 probe** uses magnetostrictive principles to measure product and water levels within tanks. The temperature of the product on the probe is determined from thermistors that are located on the magnetostrictive probe. The FMP-LL3 probe can be configured two different ways: LL3 Digital (UDP) and TSP-LL2 emulation. The purpose of running LL2 emulation is to maintain backward compatibility while having the benefits of an FMP-LL3 probe. Compared to the TSP-LL2 suspended probe, the FMP-LL3 is a bottom mounted probe.

Note: For all models, monthly and annual testing can only be performed on individual tanks. If several tanks are manifolded together, an isolation valve has to be

installed so as to separate the tanks individually during testing.

Tank Sentinel and Colibri Leak Detection System w/SCALD 2.0

The Franklin Fueling Systems TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, TS-5000 EVO and Colibri Automatic Tank Gauging (ATG) Systems with Statistical Continuous Automatic Leak Detection (SCALD) consist of a console and probe combination (TSP-LL2 or FMP-LL3 series) that can be used as a continuous monthly monitoring leak detection system in underground tanks. With the SCALD 2.0 system, up to three (3) tanks can be manifolded together, however, total aggregate capacity of all tanks cannot exceed 49,336 gallons. Maximum monthly throughput for a single tank is limited to 257,818 gallons.

Tank Sentinel and Colibri Leak Detection System w/SCALD 3

The Franklin Fueling Systems T5 Series, EVO 200, EVO 400, EVO 500, EVO 600, EVO 5000, EVO 6000, TS-550 EVO, and TS-5000 EVO Automatic Tank Gauging (ATG) Systems with Statistical Continuous Automatic Leak Detection (SCALD) 3 consist of a console and probe combination (TSP-LL2 or FMP-LL3 series) that can be used as a continuous monthly monitoring leak detection system in underground tanks. Total aggregate capacity of a tank or up to three (3) manifolded tanks, shall not exceed 32,891 gallons. Maximum monthly throughput is limited to 445,408 gallons.

When used for continuous statistical leak detection (monthly monitoring), the system determines when the tank is stable enough to begin data collection. At the beginning of each month, the Tank Sentinel activates its “quiet time” search. This is performed continuously until enough valid data is acquired to calculate a leak rate on the data collected. If it passes the 0.2 gph test, the test is recorded, and the test cycle is started over. At the end of the 30-day period the last accurate test result is recorded in the permanent tank testing record. If the leak rate does not pass, or if the data was insufficient for performing the calculation, the testing continues until a passing test occurs. A report can be generated either automatically or manually every 30 days showing the final results.

Electronic Line Leak Detectors

TS-LLD:

The TS-LLD system may be used on pipelines containing gasoline, diesel, aviation fuel, and fuel oil #4.

The TS-LLD system is available in two configurations, either as a stand-alone system or interfaced directly with the TS-1001 or TS-2001 Tank Sentinel ATG. Regardless of which configuration is selected, both are connected to a thermally activated flowmeter that is installed in the submersible pump. The control console contains a microprocessor that utilizes information provided by the flowmeter and an algorithm to determine whether or not a leak is present. The TS-LLD system has three leak detection modes - Hourly, Monthly, and Annual.

Hourly Tests for 3 gal/h leaks are automatically initiated each time that the pump is turned off. The Hourly Tests last for 3 minutes. If the line fails the Hourly Test, the system will automatically disable the pump and the control console will indicate that a leak has been detected. If the line passes the Hourly Test, the system begins conducting a Monthly Monitoring Test.

Monthly Monitoring for 0.20 gal/h leaks is automatically initiated each time that the pump is turned off and as soon as an Hourly Test has passed. Monthly Monitoring Tests can typically

vary in length from 50 minutes to 8 hours depending upon line and product conditions. If the pump is turned on while the monthly Monitoring test is in progress, the test will abort. The control console indicates the number of days that have lapsed since a Monthly Monitoring test has been passed. If a line fails the monthly test, the control console will indicate this.

The Annual Line Tightness Test for 0.10 gal/h leaks must be manually started. Franklin Fueling Systems specifies that an 8 hour waiting period must occur after the pump has been turned off before a valid annual test can be conducted. An annual test lasts for exactly 40 minutes. If a line fails the annual test, the control console will indicate an alert.

TS-LS500:

The TS-LS500 system may be used on pipelines containing gasoline, diesel, bio-diesel, aviation fuel, kerosene, fuel oil #4, alcohols, solvents, and used oil. The TS-LS500E series is an explosion proof version of the original TS-LS500 series.

The TS-LS500 system is part of the TS-550, TS-550 EVO, TS-5000, and TS-5000 EVO Automatic Tank Gauging (ATG) Systems. The TS-LS500 system consists of a pressure transducer in the line and a microprocessor in the ATG to evaluate the data from the transducer. The functional element is set above the pump operating pressure so that when the pump is shut off, the system will be able to detect a leak based on the pressure drop. The TS-LS500 has an auto learn capability which records the system characteristics during initial start-up testing, thus allowing for variations in system parameters. Rephrase following sentence such as piping bulk modulus and configuration such as the amount of rigid vs. flexible piping in a hybrid system.

For rigid, semi-rigid (FFS UPP pipe), flexible piping or hybrid piping systems consisting of both rigid and flexible piping, the TS- LS500 has three leak detection modes - Hourly, Monthly, and Annual.

Hourly tests for 3 gal/h leaks are initiated after each dispense cycle or after 45 minutes of quiet time. The test consists of 3 consecutive tests, timed at 5-minute intervals. If one of the three tests passes, the line is determined to have no gross leak. If there is a failure, the test will continue until three consecutive tests fail. Three failures will cause the alarm light to blink, the alarm horn to sound, and the pump to shut down. If there is dispensing from the line during the testing process, the testing will restart as soon as dispensing is complete. During dispensing inactivity the gross (3 GPH) test will repeat every 45 minutes after passing tests, or until there has been no dispensing (line inactive) for 2 hours.

Monthly Monitoring for 0.20 gal/h leaks is automatically initiated each time the line has been inactive for 2 hours. This test will be performed every 5 minutes until a test has passed. If there are three consecutive failures, the alarm light will flash, and the horn will sound, indicating that there is a precision leak in the system. This alarm indication will not shut down the pump unless the user selects that option.

The Annual Line Tightness Test for 0.10 gal/h leaks is initiated after the line has been inactive for 3.5 hours. This test will be performed every 5 minutes until a test has passed. If there are three consecutive failures, the alarm light will flash, and the horn will sound, indicating that there is a precision leak in the system. This alarm indication will not shut down the pump unless the user selects that option.

TS-LS500 SLLD Continuous Pressurized Piping Leak Detection System

The TS-LS500 SLLD Continuous Pressurized Piping Leak Detection System (CPPLDS) consists of an add-in module to the existing TS-LS500 Automatic Line Leak Detector (ALLD). The ALLD still performs the 3.0 gph tests, and with enough quiet time, the 0.2 gph and 0.1 gph

tests; the SLLD is only used for 0.2 gph leak detection if the ALLD did not have enough quiet time to perform that test.

The system continually collects data (pressure readings) which it evaluates with internal software to identify time intervals when there is no activity in the pipeline and the data is stable enough for analysis. An algorithm then combines data from a number of such periods until there is enough evidence to make a determination about the leak status of the pipeline. This type of system functions like an electronic line leak detector except that it reduces the time the pipeline is required to be taken out of service whenever a test is to be performed. Instead, it compiles data from shorter stable time periods and using statistical methods combines the results to estimate a leak rate.

Test data records may cover 10 days for ST (short term) CPPLDS to 30 days for LT (long term) CPPLDS dependent on dispensing cycles. The ST array continuously contains 10 days of data, and the LT array continuously contains 30 days of data that are rolled over as additional data is acquired. Precedence is given to the standard ALLD test result, if present. If not present, it defaults to SLLD and prints the ST result. It will only print the LT report if there is no ST test available for the month. If, at the end of the month, data of sufficient quality or quantity has not been obtained to calculate a result for the ST or LT CPPLDS or the standard ALLD test, the system automatically defaults to performing a standard or shut down pipeline test (requiring the pipeline to be out of service for a few hours). Pump shutdown, indicator light and alarm activation occur if leak is declared for 3.0 gph or 0.2 gph tests.

Liquid Sensors

The Franklin Fueling Systems, TS-504, TS-508, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, and TS-5000 EVO systems have the ability to work with the following sensors:

The models **TSP-EIS and FMP-EIS are** electro-optic point liquid sensors used for monitoring the dry interstitial space of double wall fiberglass and steel tanks. They are also suitable for use in containment sump spaces. When the sensor comes in contact with a liquid, it sends a signal to the console that will warn of the presence of a liquid. In fiberglass tank interstitial spaces, the sensor is fished around the outside of the inner wall of the tank and located on the bottom. In steel double wall tanks, the sensor is lowered down to the bottom of the 2" riser pipe that provides access to the interstitial space. If the sensor is used in containment sumps, it is placed on the bottom of the sump.

The model **TSP-ULS** is a universal liquid sump sensors used in monitoring containment sumps to detect for the presence of a liquid. It is also used as an interstitial sensor on steel double wall tanks. When the sensor comes in contact with a liquid, it sends a signal to the console that warns it of the presence of a liquid. It is based on a float switch technology. In containment sumps, the sensor is placed on the bottom of the sump. In steel double wall tanks, the sensor is lowered down to the bottom of the 2" riser pipe that provides access to the interstitial space.

The models **TSP-HLS and FMP-HLS are** high level overfill prevention sensors. They are used to prevent the overfilling of underground and aboveground storage tanks. It installs in a 2" NPT opening in the top of the tank. It is based on float switch technology.

The models **TSP-DIS and FMP-DIS are** discriminating liquid sensors which may be used to monitor the interstitial space of double wall tanks, sumps or other locations where the presence of liquid indicates a leak. The sensor discriminates between petroleum and water, issuing different alarms for each. In fiberglass tank interstitial spaces, the sensor is fished around the

outside of the inner wall of the tank and located on the bottom. In steel double wall tanks, the sensor is lowered down to the bottom of the 2" riser pipe that provides access to the interstitial space. If the sensor is used in containment sumps, it is placed on the bottom of the sump.

The models **TSP-DDS and FMP-DDS** are discriminating liquid sensors that provides reliable monitoring of dispenser pans and containment sumps. The TSP-DDS combines magnetic float switch sensors with an innovative polymer strip that reacts to hydrocarbons. The sensor discriminates between water and hydrocarbons, issuing different alarms for each. Three different alarms are generated by the sensor; water in the sump, product detected, and sump full. The sensor is installed in dispenser and containment sumps using a uni-strut bracket assembly that mounts to the sump piping. The sensor is mounted vertically in the sump with the bottom of the sensor touching the bottom of the sump.

The models **TSP-DTS and FMP-DTS** are discriminating liquid sensors that provides reliable monitoring of turbine and containment sumps. The TSP-DTS combines magnetic float switch sensors with an innovative polymer strip that reacts to hydrocarbons. The sensor discriminates between water and hydrocarbons, issuing different alarms for each. The sensor generates three different alarms; water in the sump, product detected, and sump full. The sensor is installed in turbine and containment sumps using a uni-strut bracket assembly that mounts to the sump piping. The sensor is mounted vertically in the sump with the bottom of the sensor touching the bottom of the sump.

The models **TSP-HIS and FMP-HIS** are hydrostatic interstitial sensors used to monitor the brine level in double wall fiberglass tanks. The sensor contains two floats; one for a low brine condition and one for a high brine condition. The console will generate a low brine alarm in the event the brine level drops below the bottom float and a high brine alarm if the brine level goes above the top float. The sensor is mounted vertically in the reservoir area and rests on the bottom of the reservoir.

The **TSP-HFS, FMP-HFS, and FMP-HFS2** horizontal float switch sensor is a 2-wire non-discriminating liquid sensor which may be used with the S940 alarm console. The TSP-HFS is designed primarily for liquid detection in fiberglass tank dry interstitial spaces.

The **TSP-UHS** Universal Hydrostatic Sensor uses float switch technology to continuously monitor liquid filled double wall containment sumps. Normally submerged, the single float TSP-UHS will provide an indication if there is a loss of monitoring liquid.

Liquid Sensors Continued:

The Franklin Fueling Systems EVO 200, EVO 400, EVO 500, EVO 600, EVO 5000, EVO 6000, TS-1001, TS-2001, TS-5000, and TS-5000 EVO systems have the ability to work with the following sensors:

The models **FMP-ULS, FMP-ULS-C, and FMP-ULS-PS** are universal liquid sump sensors used in monitoring containment sumps to detect for the presence of a liquid. They are also used interstitial sensors on steel double wall tanks. When the sensor comes in contact with a liquid, it sends a signal to the console that warns it of the presence of a liquid. It is based on a float switch technology. In containment sumps, the sensor is placed on the bottom of the sump. In steel double wall tanks, the sensor is lowered down to the bottom of the 2" riser pipe that provides access to the interstitial space.

The **FMP-UHS** Universal Hydrostatic Sensor uses float switch technology to continuously monitor liquid filled double wall containment sumps. Normally submerged, the single float FMP-

UHS will provide an indication if there is a loss of monitoring liquid.

Liquid sensors to be used only with EVO 200 and EVO 400 monitors:

The following Franklin Fueling Systems sensors may only be used with the EVO 200 and EVO 400, EVO 600, EVO 6000 monitoring systems:

The **FMP-EIS-U** electro-optic point liquid sensor is used for monitoring the dry interstitial space of double wall fiberglass and steel tanks. It is also suitable for use in containment sump spaces. When the sensor comes in contact with a liquid, it sends a signal to the console that will warn of the presence of a liquid. In fiberglass tank interstitial spaces, the sensor is fished around the outside of the inner wall of the tank and located on the bottom. In steel double wall tanks, the sensor is lowered down to the bottom of the 2" riser pipe that provides access to the interstitial space. If the sensor is used in containment sumps, it is placed on the bottom of the sump.

The **FMP-DIS-U** is a discriminating liquid sensor which may be used to monitor the interstitial space of double wall tanks, sumps or other locations where the presence of liquid indicates a leak. The sensor discriminates between petroleum and water, issuing different alarms for each. In fiberglass tank interstitial spaces, the sensor is fished around the outside of the inner wall of the tank and located on the bottom. In steel double wall tanks, the sensor is lowered down to the bottom of the 2" riser pipe that provides access to the interstitial space. If the sensor is used in containment sumps, it is placed on the bottom of the sump.

The **FMP-DDS-U** is a discriminating liquid sensor that provides reliable monitoring of dispenser pans and containment sumps. The TSP-DDS-U combines magnetic float switch sensors with an innovative polymer strip that reacts to hydrocarbons. The sensor discriminates between water and hydrocarbons, issuing different alarms for each. Three different alarms are generated by the sensor; water in the sump, product detected, and sump full. The sensor is installed in dispenser and containment sumps using a uni-strut bracket assembly that mounts to the sump piping. The sensor is mounted vertically in the sump with the bottom of the sensor touching the bottom of the sump.

The **FMP-DTS-U** is a discriminating liquid sensor that provides reliable monitoring of turbine and containment sumps. The TSP-DTS-U combines magnetic float switch sensors with an innovative polymer strip that reacts to hydrocarbons. The sensor discriminates between water and hydrocarbons, issuing different alarms for each. The sensor generates three different alarms; water in the sump, product detected, and sump full. The sensor is installed in turbine and containment sumps using a uni-strut bracket assembly that mounts to the sump piping. The sensor is mounted vertically in the sump with the bottom of the sensor touching the bottom of the sump.

The **FMP-HIS-U** is a hydrostatic interstitial sensor used to monitor the brine level in double wall fiberglass tanks. The sensor contains two floats; one for a low brine condition and one for a high brine condition. The console will generate a low brine alarm in the event the brine level drops below the bottom float and a high brine alarm if the brine level goes above the top float. The sensor is mounted vertically in the reservoir area and rests on the bottom of the reservoir.

TS-SCM Vacuum Monitoring System

The Franklin Fueling Systems Secondary Containment Monitoring (**TS-SCM**) system is designed to prevent product leakage to the environment from underground storage tanks and associated piping. This is accomplished by maintaining a constant partial vacuum on the

system relative to ambient so that any breach in the primary or secondary containment will result in a vacuum level change that is detected by the SCM system. The SCM system will be marketed by Franklin Fueling Systems as the Incon TS-SCM and the EBW AS-SCM.

The SCM operating principle uses a vacuum transducer with pre-programmed switching levels to monitor the vacuum level in the interstitial space. A console controls the submersible turbine pump/siphon and solenoid valve to control the vacuum level and trigger an alarm and pump shutdown if a significant leak is found. The approximate air or vapor leak rate which would produce an alarm is specified as greater than 85±15 liters per hour for all systems. Leaks larger than this should produce an alarm.

The SCM system maintains a constant partial vacuum on the interstitial space being monitored, including double-walled piping, double-walled tanks, and double-walled sumps. The STP siphon port is used to provide a vacuum source and is connected to the interstitial space through a solenoid valve controlled by the console. If the frequency of dispensing is not sufficient to maintain the vacuum level, the system will automatically energize the STP to restore it to the normal level.

TESTS AND RESULTS

Testing of the Franklin Fueling Systems EVO 200, EVO 400, EVO 600, EVO 6000, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS- 1001, TS-2001, TS-5000, TS-5000 EVO and Colibri systems for monthly monitoring and tank tightness testing was conducted in accordance with the EPA Automatic Tank Gauging Systems protocol. When using leak declaration thresholds of 0.05 gph and 0.10 gph, the probabilities of detection of a leak of 0.10 and 0.20 gph, respectively, were certified to within the 95-5 ranges required by the EPA protocols.

Testing of the Franklin Fueling Systems TS-5, EVO 200, EVO 400, EVO 600, EVO 6000, TS-550, TS-550 EVO, TS-750, TS-1000, TS- 1001, TS-2001, TS-5000, TS-5000 EVO and Colibri Automatic Tank Gauging (ATG) Systems with Statistical Continuous Automatic Leak Detection (SCALD) was conducted in accordance with a modified version of the EPA Automatic Tank Gauging Systems protocol. When using a leak declaration threshold of 0.10 gph, the probabilities of detection and false alarm to a leak rate of 0.20 gph were certified to within the 95-5 ranges required by the EPA protocols.

Liquid Level Probe

Testing of the FMP-LL3 probe was conducted using the Probe Comparison Protocol which has been accepted by the National Work Group on Leak Detection Evaluations. Based on the calculations, there is no statistical difference at the 5% level between the TSP-LL2 and FMP-LL3 probes. The new FMP-LL3 model probe, in any configuration, can be substituted for the older TSP-LL2 model probe.

Electronic Line Leak Detector

Testing of the TS-LLD for hourly, monthly, and annual pipeline tightness testing was conducted in accordance with either the EPA Pressurized Pipeline Leak Detection Systems protocol (rigid piping) or a modified version of same protocol adapted for flexible piping. When using leak declaration thresholds of 1.5 gph, 0.10 gph, and 0.05 gph, the probabilities of detection for a leak of 3.0, 0.20 and 0.10 gph, respectively, were certified to within the 95-5 ranges required by the EPA protocols.

Testing of the TS-LS500 Electronic Line Leak Detector for hourly, monthly, and annual pipeline tightness was conducted in accordance with either the EPA Pressurized Pipeline Leak Detection Systems protocol (rigid piping) or modified versions of same protocol adapted for semi-rigid (FFS UPP pipe), flexible or for a hybrid combination of rigid and flexible piping. When using leak declaration thresholds of 1.5 gph, 0.10 gph, and 0.05 gph, the probabilities of detection for a leak of 3.0, 0.20 and 0.10 gph, respectively, were certified to within the 95-5 ranges required by the EPA protocols.

Testing of the TS-LS500 SLLD Continuous Pressurized Piping Leak Detection System (CPPLDS) for monthly pipeline tightness testing was conducted in accordance with a modified version of the EPA Pressurized Pipeline Leak Detection Systems protocol adapted for the evaluation of Continuous Pressurized Piping Leak Detection Systems. When using leak declaration thresholds of 0.8 gph, the probability of detection for a leak of 0.2 gph was certified to within the 95-5 ranges required by the EPA protocols.

Liquid Sensors

Testing of the liquid and brine sensors were conducted in accordance with a modified version of the EPA Standard "Liquid-Phase Product Detectors" protocol.

TS-SCM Vacuum Monitoring System

The procedures used to evaluate the Franklin Fueling Systems SCM follow the procedures described in the European protocol with exceptions as noted in the 3rd party testing documentation that was provided. Several types of tests were conducted. For purposes of this discussion, they are described in the order they are presented in the protocol.

Three sets of reliability tests were conducted during the evaluation. Testing was conducted for all three tests sets by introducing a leak sufficient to produce an alarm at five-minute intervals.

1. The first set of tests was conducted for a total test period of 200 hours, at 20±5 deg C.
2. The second test was conducted over the temperature range from -25±2 deg C to 25±2 deg C for a period of 120 hours
3. The third set conducted tests at 5 minute intervals over the temperature range from 25±2deg C to 70±2 deg C for a period of 120 hours.

Tests show that the vacuum monitoring system will perform as designed for leak detection requirements with an acceptable reliability.

MONITORING SYSTEM OUTPUT

Detailed here are examples of the typical Alarm Report, Tank Leak Report, Tank Auto Leak Report, and Line Leak Test Report for the TS-750, TS-1000, TS-1001, TS-2001.

INCON INTELLIGENT CONTROLS INC
P.O. BOX 638
SACO ME 040722

08/13/1998 10:16 AM

LEAK TEST REPORT

(TANK NAME) 5014.3 GAL
(PRODUCT NAME)

LEAK TEST	0.100 G/H
LEAK THRESHOLD	0.050 G/H
CONFIDENCE LEVEL	99.0%
TEST STARTED	21:45
TEST STARTED	10/17/98
GROSS CAPACITY	56.12%
BEGIN GROSS	2814.2 GAL
BEGIN NET	2808.8 GAL
BEGIN LEVEL	52.630
BEGIN TEMP	62.720 F
BEGIN WATER	0.0130 IN
END TIME	2:39
END DATE	10/19/98
END GROSS	2814.3 GAL
END NET	2808.6 GAL
END LEVEL	52.632 IN
END TEMP	62.878 F
END WATER	0.4 GAL
END WATER 0.131 IN	

HOURLY DATA

TIME	DEG F	GAL
22:44	62.721	2809.23
23:44	62.751	2808.78
0:44	62.885	2809.07
1:44	62.883	2809.9

SLOPE	-0.04 GAL/HR
SLOPE LOW	-0.04 GAL/HR
SLOPE HIGH	-0.04 GAL/HR
TEST RESULTS	PASSED

SLOPE EQUALS CALCULATED LEAK RATE

Tank Leak Report Example

INCON INTELLIGENT CONTROLS INC
P.O. BOX 638
SACO ME 040722

08/13/1998 10:16 AM

LINE COMPLIANCE REPORT

LINE NO. 1 REGULAR

PASSED MONTHLY TESTS

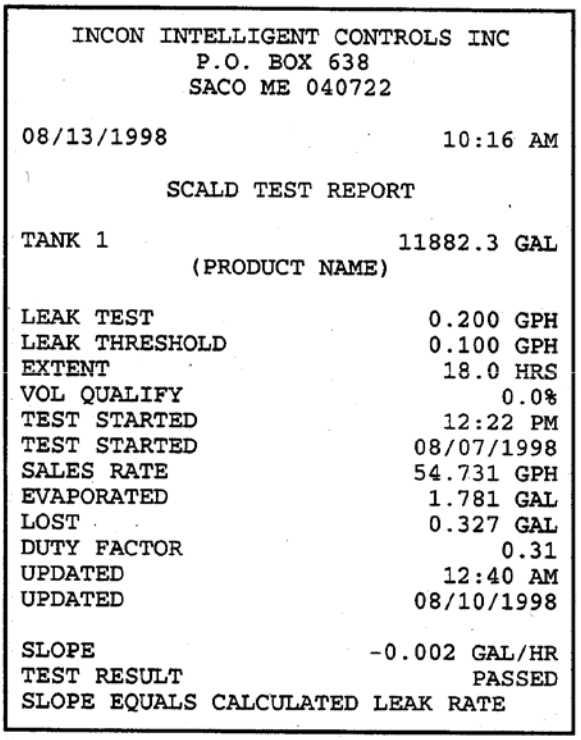
TEST TIME	1:42 AM
TEST DATE	08/12/1998
LINE TEST	0.20 GPH
LEAK RATE	0.00 GPH
TEST TIME	11:12 PM
TEST DATE	07/14/1998
LINE TEST	0.20 GPH
LEAK RATE	0.00 GPH

LINE NO. 2 MID GRAD

PASSED MONTHLY TESTS

TEST TIME	8:15 AM
TEST DATE	08/11/1998
LINE TEST	0.20 GPH
LEAK RATE	0.00 GPH
TEST TIME	4:41 AM
TEST DATE	07/14/1998
LINE TEST	0.20 GPH
LEAK RATE	0.00 GPH

Line Leak Report Example: Monthly



INCON INTELLIGENT CONTROLS INC
P.O. BOX 638
SACO ME 040722

08/13/1998 10:16 AM

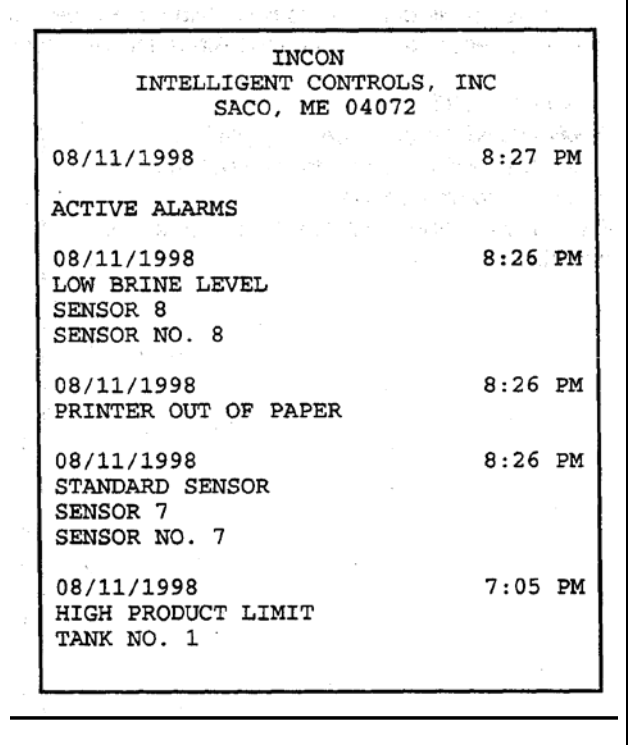
SCALD TEST REPORT

TANK 1 11882.3 GAL
(PRODUCT NAME)

LEAK TEST	0.200 GPH
LEAK THRESHOLD	0.100 GPH
EXTENT	18.0 HRS
VOL QUALIFY	0.0%
TEST STARTED	12:22 PM
TEST STARTED	08/07/1998
SALES RATE	54.731 GPH
EVAPORATED	1.781 GAL
LOST	0.327 GAL
DUTY FACTOR	0.31
UPDATED	12:40 AM
UPDATED	08/10/1998
SLOPE	-0.002 GAL/HR
TEST RESULT	PASSED

SLOPE EQUALS CALCULATED LEAK RATE

Auto Leak Report Example: Current status of 24-hour leak detection (SCALD).



INCON
INTELLIGENT CONTROLS, INC
SACO, ME 04072

08/11/1998 8:27 PM

ACTIVE ALARMS

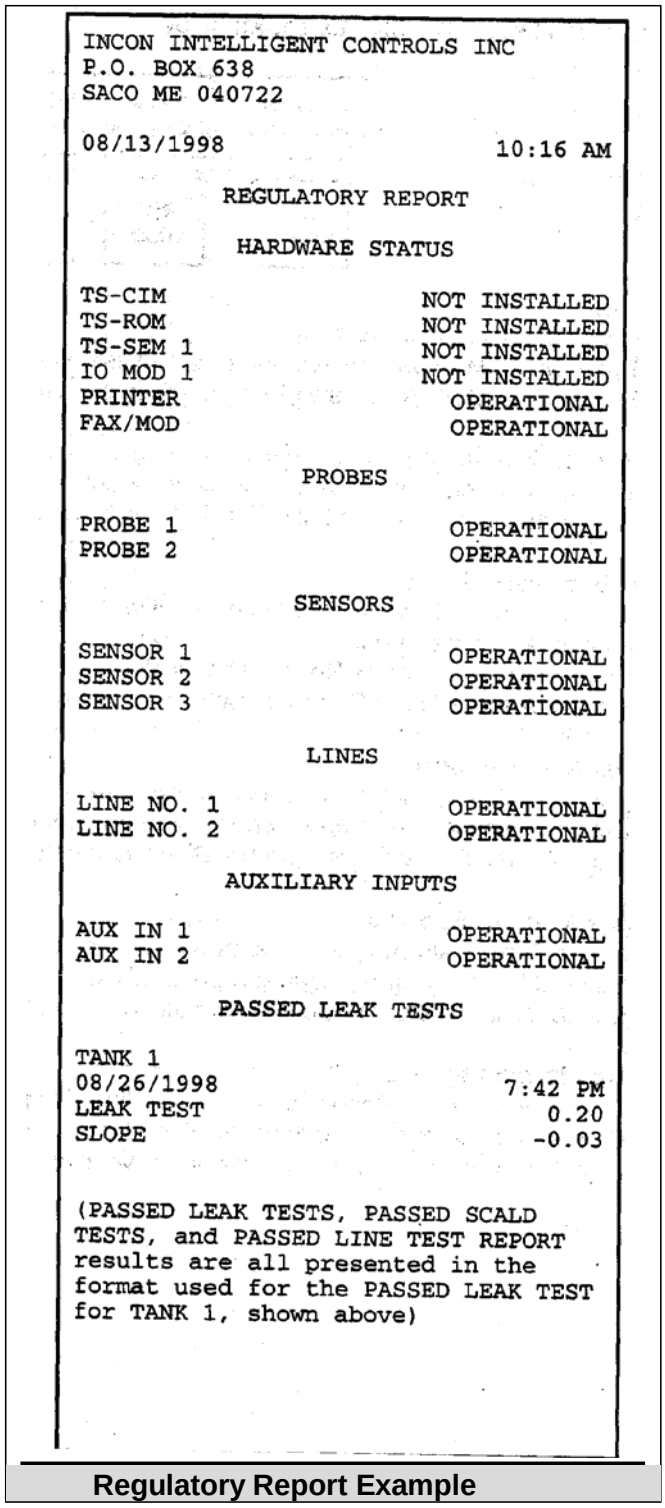
08/11/1998 8:26 PM
LOW BRINE LEVEL
SENSOR 8
SENSOR NO. 8

08/11/1998 8:26 PM
PRINTER OUT OF PAPER

08/11/1998 8:26 PM
STANDARD SENSOR
SENSOR 7
SENSOR NO. 7

08/11/1998 7:05 PM
HIGH PRODUCT LIMIT
TANK NO. 1

Sensor Status Report Example



INCON INTELLIGENT CONTROLS INC
P.O. BOX 638
SACO ME 040722

08/13/1998 10:16 AM

REGULATORY REPORT

HARDWARE STATUS

TS-CIM	NOT INSTALLED
TS-ROM	NOT INSTALLED
TS-SEM 1	NOT INSTALLED
IO MOD 1	NOT INSTALLED
PRINTER	OPERATIONAL
FAX/MOD	OPERATIONAL

PROBES

PROBE 1	OPERATIONAL
PROBE 2	OPERATIONAL

SENSORS

SENSOR 1	OPERATIONAL
SENSOR 2	OPERATIONAL
SENSOR 3	OPERATIONAL

LINES

LINE NO. 1	OPERATIONAL
LINE NO. 2	OPERATIONAL

AUXILIARY INPUTS

AUX IN 1	OPERATIONAL
AUX IN 2	OPERATIONAL

PASSED LEAK TESTS

TANK 1

08/26/1998	7:42 PM
LEAK TEST	0.20
SLOPE	-0.03

(PASSED LEAK TESTS, PASSED SCALD TESTS, and PASSED LINE TEST REPORT results are all presented in the format used for the PASSED LEAK TEST for TANK 1, shown above)

Regulatory Report Example

Detailed here are examples of the typical Alarm Report, Tank Leak Report, Tank Auto Leak Report, and Line Leak Test Report for the TS-5XXX series.

Site ID 1
Site ID 2
Site ID 3
Site ID 4
Site ID 5
Date *Time*

Tank Test Report

Specified Time Frame

Volume: (gal) *programmed*
Length: (in) *programmed*
Temperature: (F) *programmed*
TANKS

Tank #
Product #
Maximum Capacity
#.##
Begin Time
Date *Time*
Begin Gross
##
Begin Net
##
Begin Level
##
Begin Temperature
##
Begin Water Level
##
Begin Water Vol
##
End Time
Date *Time*
End Gross
##
End Net
##
End Level
##
End Temperature
##
End Water Level
##
End Water Vol
##
Last Delivery

Test Type
Monthly
Threshold
#.##
Leak Rate
#.##
Result
Pass/Fail/Abort/Incomplete
Capacity
#.##

Details
Time
Date *Time*
Net Volume
##
Temperature
##
Level
##
Time
Date *Time*
Net Volume
##
Temperature
##
Level
##

Tank Test Report Example

Gross

Site ID 1
Site ID 2
Site ID 3
Site ID 4
Site ID 5

LINE LEAK REPORT

GROSS TEST
Line #
Gross Leak test Passed
Line #
Gross Leak test Passed
mm/dd/yyyy hh:mm:ss:23

Monthly

Site ID 1
Site ID 2
Site ID 3
Site ID 4
Site ID 5

LINE LEAK REPORT

MONTHLY TEST
Line #
Monthly Leak test Passed
Line #
Monthly Leak test Passed
mm/dd/yyyy hh:mm:ss:23

Annual

Site ID 1
Site ID 2
Site ID 3
Site ID 4
Site ID 5

LINE LEAK REPORT

ANNUAL TEST
Line #
Annual Leak Test Passed
Line #
Annual Leak Test Passed
mm/dd/yyyy hh:mm:ss

Line Leak Report Example: Gross, Monthly, Annual

Site ID 1
Site ID 2
Site ID 3
Site ID 4
Site ID 5
Date *Time*

SCALD Report

Specified Time Frame

Volume: (gal) *programmed*
Length: (in) *programmed*
Temperature: (F) *programmed*
TANKS

Tank #
Product #
Maximum Capacity
#.##
Started
Date *Time*
Result
(Pass)
Slope
#.##########
Status
#.#
Ended
Date *Time*
Vol %
#.##
Type
(Monthly)

SCALD Report Example: Current status of 24-hour leak detection.

USA
03/10/2010 09:24

Sensor Report

Last Available

3 WIRE SENSOR

DISPENSER 1/2 SUMP
Status:
Ok
State:
Ok
Date:
03/09/2010 12:00:00

UNLEADED SUB SUMP
Status:
Ok
State:
Ok
Date:
03/09/2010 12:00:00

Sensor Status Report Example

Site ID 1
Site ID 2
Site ID 3
Site ID 4
Site ID 6

Regulatory Report

Passed Tests

From: mm/dd/yyyy
To: mm/dd/yyyy
Flow: gph

TANKS (MONTHLY)

Device
Tank #
Name
Tank#
Type
Monthly
Slope
#.##
Start Date
mm/dd/yyyy hh:mm:ss
End Date
mm/dd/yyyy hh:mm:ss

LINES (MONTHLY)
Device
Line #
Name
Line#
End Date
mm/dd/yyyy hh:mm:ss

LINES (ANNUAL)
Device
Line #
Name
Line#
End Date
mm/dd/yyyy hh:mm:ss

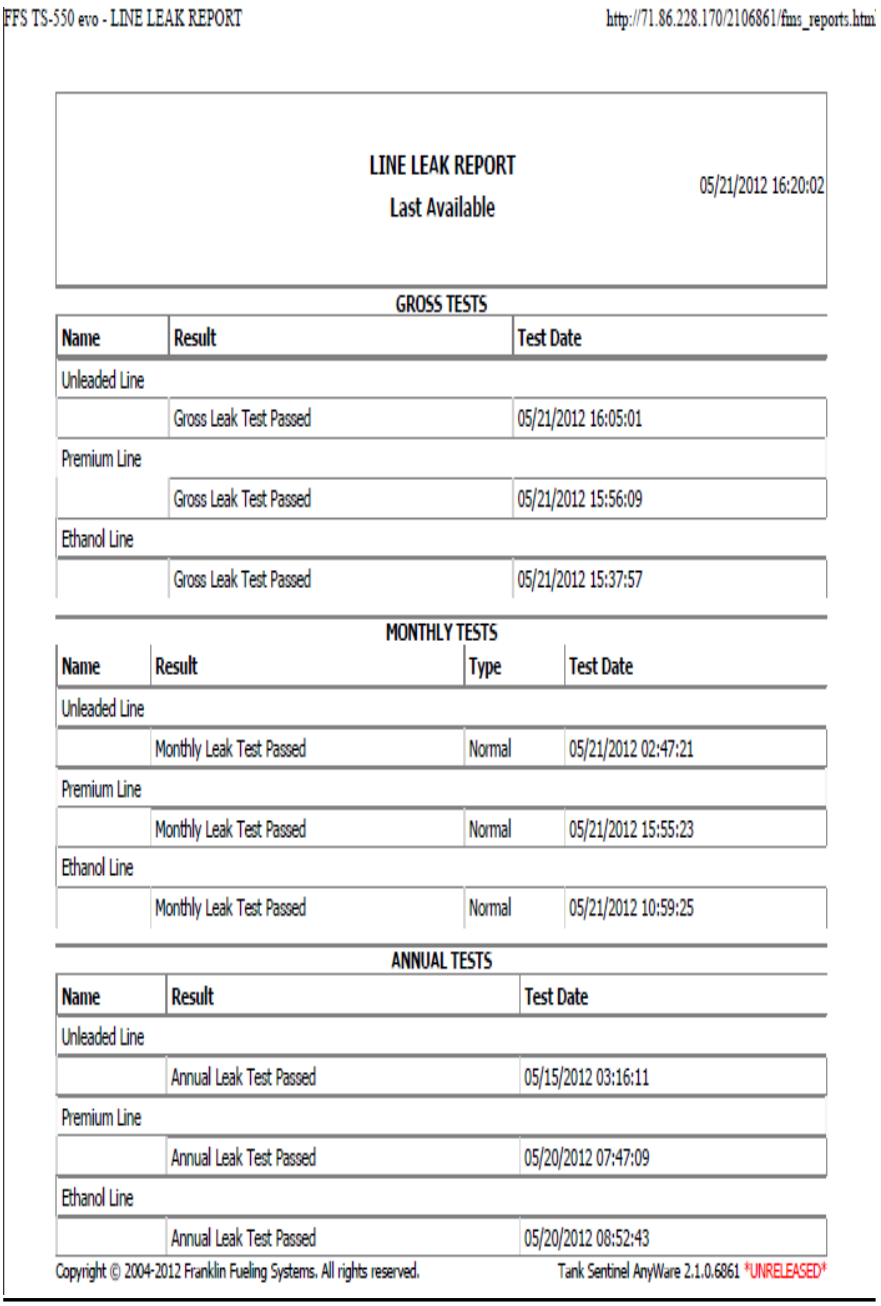
2-WIRE SENSOR (MONTHLY)

Name
Sensor Name
End Date
mm/dd/yyyy hh:mm:ss

3-WIRE SENSOR (MONTHLY)

Name
Sensor Name
End Date
mm/dd/yyyy hh:mm:ss

Regulatory Report Example



FFS TS-550 evo - LINE LEAK REPORT http://71.86.228.170/2106861/fms_reports.htm

LINE LEAK REPORT
Last Available
05/21/2012 16:20:02

GROSS TESTS

Name	Result	Test Date
Unleaded Line		
	Gross Leak Test Passed	05/21/2012 16:05:01
Premium Line		
	Gross Leak Test Passed	05/21/2012 15:56:09
Ethanol Line		
	Gross Leak Test Passed	05/21/2012 15:37:57

MONTHLY TESTS

Name	Result	Type	Test Date
Unleaded Line			
	Monthly Leak Test Passed	Normal	05/21/2012 02:47:21
Premium Line			
	Monthly Leak Test Passed	Normal	05/21/2012 15:55:23
Ethanol Line			
	Monthly Leak Test Passed	Normal	05/21/2012 10:59:25

ANNUAL TESTS

Name	Result	Test Date
Unleaded Line		
	Annual Leak Test Passed	05/15/2012 03:16:11
Premium Line		
	Annual Leak Test Passed	05/20/2012 07:47:09
Ethanol Line		
	Annual Leak Test Passed	05/20/2012 08:52:43

Tank Sentinel AnyWare 2.1.0.6861 *UNRELEASED*

SLLD FMS Report Example (Tank Sentinel AnyWare software)

SCM Reports

SCM reports are available on demand from the console locally or remotely (with TSA). Several report options may be used to print or save generated reports. For more information on reports in general, please refer to either the *T5 Series Programming Manual* (p/n 000-2142) or the *T5 Series Operator's Guide* (p/n 000-2151).

SCM Alarm Reports

SCM Alarm Reports include any SCM alarms or application events that occurred within the date range chosen by the user. An example of an SCM Alarm History Report can be found below.

INCON
Franklin Fueling Systems
3760 Marsh Road
Madison, WI 53718
608-838-8786
USA

Last 30 Days

27-Feb-07 16:00:05

SCM Alarm History Report

Device	Description	Type	Date Occurred	Date Cleared
Containment 1	Vacuum Pressure Sensor Failed/Not Connected	Warning	23-Feb-07 17:47:02	
Containment 1	Not Learned	Warning	23-Feb-07 17:47:02	

LIMITATIONS / CONDITIONS OF APPROVAL

General

- 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. Records of sampling, testing, or monitoring shall be maintained in accordance with **s. 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.

- While 3rd party testing does determine a required minimum tank level, EPA leak detection regulations require testing of the portion of the tank system which routinely contains product. Consistent testing at low levels could allow a leak to remain undetected.

- During leak testing, a minimum level of product in tank shall be maintained so as to ensure testing of the portion of the tank and/or piping that routinely contains product, regardless of testing system capability. For instance, if product levels are routinely maintained at 60%, but the leak detection system is capable of testing at 15% product level, then testing shall be performed at 60% levels.

- If performing a tank tightness test, minimum tank level shall be 95%, regardless of leak detection system capability, in accordance with **s. ATCP 93.515(4)**.

- Automatic tank gauges shall be programmed to provide an audible and visual alarm in the event of a tank test fail, periodic monthly tank test not performed within a 30-day interval, or tank interstitial sensor actuation. Silencing of the alarm shall require manual operator action.

- Electronic line leak detection shall be programmed to provide an audible and visual alarm

in addition to providing shut-down of the submersible pump in the event of a line test fail. The ELLD shall also be programmed to provide an audible and visual alarm in the event a periodic monthly line test was not performed within a 30-day interval. Silencing of either alarm shall require manual operator action.

- Sensors used for interstitial line monitoring shall be programmed to provide an audible and/or visual alarm in addition to providing shut-down of the submersible pump or individual dispenser(s) in the event of a sump/interstitial monitoring sensor actuation. Silencing of the alarm shall require manual operator action.

Tank Sentinel **EVO 200, EVO 400, EVO 600, EVO 6000, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, TS-5000 EVO and Colibri *ATG's*** (static 0.2 gph monthly monitoring and 0.1 gph tightness testing)

- Critical performance parameters for the EVO 200, EVO 400, EVO 600, EVO 6000, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS- 1001, TS-2001 TS-5000, TS-5000 EVO and Colibri ATG's with the TSP-LL2 or FMP-LL3 probes **(Note that EVO 200 and EVO 400 consoles are only certified to be used with FMP-LL3 probes)**:

Parameter	Value
Maximum Tank Size[1]	**Up to 15,000 gallons**
Software Version	**N/A**
Minimum Tank Level	Minimum product level is based on tank diameter as follows: **24" dia/min 9";** **36" dia/min 10.5";** **48" dia/min 12";** **52" dia/min 12.5";** **64" dia/min 14";** **72" dia/min 15";** **76" dia/min 15.5";** **84" dia/min 16.5";** **96" dia/min 17.5";** **108" dia/min 19";** **120" dia/min 21";** **126" dia/min 21.5";** **132" dia/min 22";** **144" dia/min 23.5";**
Waiting time between filling tank and test start[2]	**6 hours minimum**
Waiting time between dispensing and test start	**None**
Test Period[3]	**Variable based on quality of test data.** **Average times[4]:** **5 hrs. 10 min.** (monthly-0.2 gph) **5 hrs. 44 min.** (annual-0.1 gph)

1: Monthly and annual testing can only be performed on one tank at a time. If several tanks are manifolded together, an isolation valve will have to be installed so as to separate the tanks individually.
2: There must be no delivery during waiting time.
3: There must be no delivery or dispensing during testing.
4: System automatically determines minimum time based on test conditions being met. Test times will generally be longer for larger tanks.

Tank Sentinel **EVO 200, EVO 400, EVO 600, EVO 6000, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, TS-5000 EVO and Colibri ATG's** (static 0.2 gph monthly monitoring only)

- Critical performance parameters for the TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001 TS-5000, TS-5000 EVO, and Colibri ATG's with the **TSP-LL2 or FMP-LL3 probes (Note that EVO 200 and EVO 400 consoles are only certified to be used with FMP-LL3 probes)**:

Parameter	Value
Maximum Tank Size[1]	**Up to 30,000 gallons**
Software Version	**N/A**
Minimum Tank Level	Minimum product level is based on tank diameter as follows: **24" dia/min 9";** **36" dia/min 10.5";** **48" dia/min 12";** **52" dia/min 12.5";** **64" dia/min 14";** **72" dia/min 15";** **76" dia/min 15.5";** **84" dia/min 16.5";** **96" dia/min 17.5";** **108" dia/min 19";** **120" dia/min 21";** **126" dia/min 21.5";** **132" dia/min 22";** **144" dia/min 23.5";**
Waiting time between filling tank and test start[2]	**4 hours minimum[3]**
Waiting time between dispensing and test start	**2 hours minimum**
Test Period[4]	**Variable based on quality of test data.** **Average time[5]:** **6 hrs. 51 min.**

1: Monthly and annual testing can only be performed on one tank at a time. If several tanks are manifolded together, an isolation valve will have to be installed so as to separate the tanks individually.
2: There must be no delivery during waiting time.
3: This probe can only perform a 0.2 gph monthly test.
4: There must be no delivery or dispensing during testing.
5: System automatically determines minimum time based on test conditions being met. Test times will generally be longer for larger tanks.

Tank Sentinel* TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, TS-5000 EVO and Colibri *ATG's w/SCALD 2.0(24-hour, 0.2 gph monthly monitoring)

- Critical performance parameters for the using the Tank Sentinel TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001 TS-5000, TS-5000 EVO and Colibri ATG's w/SCALD and **TSP-LL2 or FMP-LL3 probes** are:

Parameter	Value
Maximum Tank Size[1]	**Up to 49,336 gallons**
Maximum Number of Manifolded Tanks	**3**
Software Version	**N/A**
Minimum Tank Level[2]	**14%**
Maximum Monthly Throughput	**257,818 gallons**

1: For single or aggregate capacity of manifolded tanks.
2: The SCALD system will automatically check the tank level, and not perform a test if the tank level is below the minimum.

Tank Sentinel* T5 Series, EVO 200, EVO 400, EVO 600, EVO 6000, TS-550 EVO, TS-5000 EVO *ATG's w/SCALD 3 (24-hour, 0.2 gph monthly monitoring)

- Critical performance parameters for the using the Tank Sentinel T5 Series, EVO 200, EVO 400, EVO 600, EVO 6000, TS-550 EVO, TS-5000 EVO and Colibri ATG's w/SCALD 3 and **TSP-LL2 or FMP-LL3 probes (Note that EVO 200 and EVO 400 consoles are only certified to be used with FMP-LL3 probes)**:

Parameter	Value
Maximum Tank Size[1]	**Up to 32,891 gallons**
Maximum Number of Manifolded Tanks	**3**
Software Version	**N/A**
Minimum Tank Level[2]	**14%**
Maximum Monthly Throughput	**445,408 gallons**

1: For single or aggregate capacity of manifolded tanks.
2: The SCALD system will automatically check the tank level, and not perform a test if the tank level is below the minimum.

Electronic Line Leak Detector

- The Franklin Fueling Systems Electronic Line Leak Detector is approved for use on pipeline systems for underground storage tank facilities that contain petroleum or other chemical products. It is approved for use on rigid, semi rigid (FFS UPP piping,TS-LS500 only) and flexible piping.

- When installing the TS-LS500 auto-learn line leak detection system, a third party precision tightness test shall be performed prior to beginning the auto-learn process. The precision tightness test results shall be included with the line leak detection form TR-WM-133 (formerly ERS-9LD) submittal to the Department.

- 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 **s. ATCP 93.515(8)(d)**. The individual performing the

test must be qualified by the equipment manufacturer.

- The system may be used with trapped vapor present in the line.

- **Mechanical line leak detectors cannot be installed in the same line as the electronic line leak detector.**

- Critical performance parameters for the **TS-LLD Electronic Line Leak Detector:**

Parameter	Value
Total maximum allowable volume of product in any **flexible** test pipeline	**39.5 gallons or less**
Total maximum allowable volume of product in any **rigid** test pipeline	**163 gallons or less**

Note: All other critical parameters, such as test line pressure; minimum test times; minimum wait times between product dispensing and start of test are pre-programmed into the software and are not accessible for viewing.

- Critical performance parameters for the **TS-LS500 Electronic Line Leak Detector:**

Parameter	Value
Total maximum allowable volume of product in any **flexible** test pipeline	**95.5 gallons or less**
Total maximum allowable volume of product in any **rigid** test pipeline	**312.2 gallons or less**
Total maximum allowable volume of product in semi-rigid (Franklin Fueling Systems UPP) test pipeline	**176 gallons or less**
Total maximum allowable volume of product in any **Hybrid** (rigid and flexible piping combination) test pipeline	**415.8 gallons or less**[1]

1: The capacity of the flexible component cannot exceed 95.4 gallons

Note: All other critical parameters, such as test line pressure; minimum test times; minimum wait times between product dispensing and start of test are pre-programmed into the software and are not accessible for viewing.

Minimum pressure requirements

Item	Value
Minimum Static Pressure	15 PSI (103.4 kPa) for gross 3 GPH test 18 PSI (124.1 kPa) monthly .2 Precision test 18 PSI (124.1 kPa) annual .1 Precision tests 20 PSI (137.9 kPa) for learning lines

Pipe length to hold minimum line volume

Pipe diameter ID	1"	1 ½"	1 ¾"	2"	2 ½"	3"	4"	5"
Both Flex and Rigid Length	61'	27'	20'	15'	10'	7'	4'	2'
Metric	(18.6 m)	(8.2 m)	(6.0 m)	(4.6 m)	(3.0 m)	(2.1 m)	(1.2 m)	(0.6 m)

Pipe length to hold maximum line volume

Pipe Diameter ID	1"	1 ½"	1 ¾"	2"	2 ½"	3"	4"	5"
Flex Length	2339' (713 m)	1040' (317 m)	764' (233 m)	585' (178 m)	374' (114 m)	260' (79 m)	146' (45 m)	94' (29 m)
Rigid Length	7656' (2334 m)	3403' (1037 m)	2500' (762 m)	1914' (583 m)	1225' (373 m)	851' (259 m)	479' (146 m)	306' (93 m)

Maximum and minimum line volume for rigid and flexible pipe

Item	Volume
Maximum line volume for rigid pipe	312.2 gal (1181.8 L)
Maximum line volume for flexible pipe	95.4 gal (361.1 L)
Minimum line volume for rigid or flexible pipe	2.5 gal (9.5 L)

- Critical performance parameters for the **TS-LS500 SLLD Continuous Pressurized Piping Leak Detection System (CPPLDS):**

Parameter	Value
Maximum Monthly Throughput	**391,250 gallons**
Total maximum allowable volume of product in any **flexible** test pipeline	**95.5 gallons or less**
Total maximum allowable volume of product in any **rigid** test pipeline	**312.2 gallons or less**
Total maximum allowable volume of product in any **Hybrid** (rigid and flexible piping combination) test pipeline	**415.8 gallons or less**[1]

1: The capacity of the flexible component cannot exceed 95.4 gallons

Note: All other critical parameters, such as test line pressure; minimum test times; minimum wait times between product dispensing and start of test are pre-programmed into the software and are not accessible for viewing.

Liquid Level Sensors

The Liquid Sensors shall be placed such that a release from any portion of the tank or piping will be detected.

Part Number	Description	Application	Compatible Consoles
TSP-EIS **FMP-EIS**	Electro-optic Liquid Sensor	Fiberglass or Steel Tank Dry Interstitial and Containment Sumps	TS-504, TS-508, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, and TS-5000 EVO
FMP-EIS-U	Electro-optic Liquid Sensor	Fiberglass or Steel Tank Dry Interstitial and Containment Sumps	EVO 200 EVO 400 EVO 600 EVO 6000
TSP-HLS **FMP-HLS**	Liquid Level Sensor	Tank Overfill	TS-504, TS-508, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, and TS-5000 EVO
TSP-HIS **FMP-HIS**	Dual Float Liquid Level	Brine Filled Interstitial of Double Wall Fiberglass Tank and Sump	TS-504, TS-508, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, and TS-5000 EVO
FMP-HIS-U	Dual Float Liquid Level	Brine Filled Interstitial of Double Wall Fiberglass Tank and Sump	EVO 200 EVO 400 EVO 600 EVO 6000
TSP-ULS	Float liquid Sensor	Steel Tank Interstitial and Containment Sumps	TS-504, TS-508, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, and TS-5000 EVO
FMP-ULS **FMP-UHS** **FMP-ULS-C** **FMP-ULS-PS**	Float liquid Sensor	Steel Tank Interstitial and Containment Sumps	EVO 200, EVO 400, EVO 600, EVO 6000,TS-1001, TS-2001, TS-5000, and TS-5000 EVO

TSP-DIS **FMP-DIS**	Discriminating Liquid Sensor	Fiberglass or Steel Tank Dry Interstitial and Containment Sumps	TS-504, TS-508, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, and TS-5000 EVO
FMP-DIS-U	Discriminating Liquid Sensor	Fiberglass or Steel Tank Dry Interstitial and Containment Sumps	EVO 200 EVO 400 EVO 600 EVO 6000
TSP-DTS **TSP-DDS** **FMP-DTS** **FMP-DDS**	Float Technology Liquid Sensor w/Hydrocarbon Sensing Strip	Containment Sumps	TS-504, TS-508, TS-5, TS-550, TS-550 EVO, TS-750, TS-1000, TS-1001, TS-2001, TS-5000, and TS-5000 EVO
FMP-DTS-U **FMP-DDS-U**	Float Technology Liquid Sensor w/Hydrocarbon Sensing Strip	Containment Sumps	EVO 200 EVO 400 EVO 600 EVO 6000

TS-SCM

Site Requirements

Total Containment Volume*	Minimum - 0.25 gallons (1 L) Maximum - 500 gallons (1879 L)
Normal Operating Vacuum	2" – 6" Hg (1 – 3 PSIG)
Pre-Programmed Maximum Shutdown (Alarm Condition)	9" Hg (4.5 PSIG)
Mechanical Relief Valve Vacuum**	10" Hg (5 PSIG)
Jumper Tubing	Use only supplied vacuum tubing
Vacuum Sensor Wiring	Belden No. 87761(0.12" OD) to 400 ft. Belden No. 89182(0.31" OD) to 500 ft. (maximum distance)
Solenoid Wiring	600 V, 18 AWG minimum, UL approved refer to ANSI/NFPA70 or CEC electrical codes

*Refer to manufacturers' installation guides or data sheets to calculate containment area volumes.

**All containment areas MUST be compatible with the vacuum levels listed.

Note: SCM should be tested annually after installation.

This approval will be valid through December 31, 2025, 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: 8/22/22

Reviewed by: _____ Date: 8/17/2022

Erik Otterson
Environmental Engineering Specialist
Bureau of Weights and Measures
Storage Tank Regulation

Approved by: _____ Date: 8/17/2022

Greg Bareta, P. E.
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