Department of Environmental Protection

2600 Blair Stone Road ♦ Tallahassee, Florida 32399-2400

DEP Form: 62-761.900(9)
Form Title: Storage Tank Equipment Registration Form
Effective Date: July 2019
Incorporated in Rule 62-761.850, F.A.C.

Storage Tank System Equipment Registration Form

Fill out completely

General Information

Company Name: Franklin Electric - Fueling Systems

Contact Name: Brad Fawcett / Jason Garrett

Company Address: 3760 Marsh Road

City, State: Madison, WI Zip: 53718

E-mail: bradley.fawcett@fele.com

Contact Number: 608-838-5650

Product Name: Statistical Continuous Automatic Leak Detection 3 (SCALD3®)

Model Number(s): SCALD 3(CITLDS)

Product Type: Leak Detection / Continuous Automatic Tank Ga

Rule(s) citation that registration is being requested within Chapter 62-761 (UST), and/or 62-762 (AST),
62-761.640

F.A.C.: Write a brief description of equipment registration request including product limitations:

Statistical Continuous Automatic Leak Detection 3 (SCALD3) software is an algorithm design to continuously gather and analyze data to detect leaks in underground storage tanks. SCALD3 runs on several Franklin Fueling Systems' automatic tank gauges (ATGs) and is 3rd party certified to monitor tank and manifolds with a capacity of up to 32,891 gallons.

Information Checklist (Choose Yes, No, or N/A - Not Applicable):

	Yes	No	N/A
1. Third-party Certification by a Nationally Recognized Testing Laboratory? (Required)	✔	☐	
2. Documentation of third-party evaluation that the equipment meets DEP Rules?	✔	☐	☐
3. Documents included about the qualifications of the Nationally Recognized Testing Laboratory?	✔	☐	☐
4. Technical information and drawings included?	✔	☐	☐
5. Installation instructions included?	☐	☐	✔
6. Annual Operability Testing Requirements (Rules 62-761.500, 62-762.501, & 62-762.502 F.A.C.)?	✔	☐	☐
7. Integrity Testing Requirements (Rules 62-761.700, 62-762.701, & 62-762.702, F.A.C.)?	✔	☐	☐
8. Compatible with fuel blends containing >10% ethanol or >20% biodiesel?	✔	☐	☐
9. Has the product been approved or registered in other countries or states? (If so provide list)	☐	✔	☐
10. Any requirements for company-certified installers or trainers?	☐	✔	☐
11. Was this product(s) previously approved or registered by the Department? If yes, EQ- 891	✔	☐	☐
12. Any changes or modifications to the equipment since the last submittal to DEP?	☐	✔	☐

Document Information: Provide supporting documents indicated as "Yes" above including this form via email to Tanknotify@floridadep.gov, or documents can be sent to FDEP, Division of Waste Management, 2600 Blair Stone Road, MS 4560, Tallahassee, FL 32399.

Write a brief description of equipment installation and performance in the U.S.:

SCALD 3 is an software option on the Franklin Fueling Systems TS-5, TS-550, TS-5000, TS-550evo, TS-5000evo, Colibri, EVO 200 and EVO 400 consoles with Magnetostrictive probe and is installed and configured as a part of those consoles. SCALD runs 24 hrs per day performing 0.2 GPH tests on tanks and manifolds at sites that do not have enough quiet time to complete static tests. The algorithm gathers data and statistically analyzes that data to complete tha 0.2 GPH tests.

Equipment Registration Certification:

To the best of my knowledge and belief, all information submitted on this form is true, accurate and complete.

Brad Fawcett, Product Certification Engineer	Fawcett, Bradley — Digitally signed by Fawcett, Bradley Date: 2022.12.22 10:52:38 -06'00'	12/22/2022
Printed Name and Title	Signature (right click to sign)	Date

For Department Use Only:

Date Application Received: 02/15/2023 Application complete: Yes: ✔ No: ☐

EQ- 891 Date of complete or incomplete letter sent: 02/28/2023 Date Equipment Requires Renewal: 2/28/2028

Storage tank system equipment requires renewal every 5 years in accordance with subsection 62-761.850(2), F.A.C.

Department of Environmental Protection

2600 Blair Stone Road ♦ Tallahassee, Florida 32399-2400

Storage Tank Equipment Registration Form

Fill out completely

General Information

Company Name: FRANKLIN FUELING SYSTEMS
Contact Name: Sandy Adams
Company Address: 3760 Marsh Rd
City: Madison, WI.
Zip: 53718
E-mail: sadams@franklinfueling.com
Contact Number: 1-608-838-5668
Product Name: Statistical Continuous Automatic Leak Detection 3 (SCALD3®)
Model Number(s): SCALD 3(CITLDS)
Product Type: UST, RELEASE DETECTION
Rule(s) citation within Chapter 62-761, or 62-762, F.A.C. that registration is being requested:
62-761.640

Write a brief description of equipment registration request including product limitations:

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Information Checklist

	Yes	No	N/A
1. Third-party Certification by a Nationally Recognized Testing Laboratory?	✔		
2. Documentation of third-party evaluation that the equipment meets DEP Rules?	✔		
3. Documents included about the qualifications of the Nationally Recognized Testing Laboratory?	✔		
4. Installation instructions included?			✔
5. Technical information and drawings included?	✔		
6. Annual Operability Testing Requirements (Rules 62-761.700, 62-762.701, & 62-762.702 F.A.C.)?			✔
7. Compatible with fuel blends containing >10% ethanol or >20% biodiesel?	✔		
8. Has the product been approved or registered in other countries or states? (If so provide list)		✔	
9. Any requirements for company-certified installers or trainers?		✔	
10. Was this product(s) previously approved or registered by the Department?		✔	
If yes, please specify the Equipment Number: **EQ-**______		✔	
11. Any changes or modifications to the equipment since the last submittal to DEP?		✔	

Document Information: Provide supporting documents indicated as "Yes" above including this form via email to Tanknotify@dep.state.fl.us, or documents can be sent to FDEP, Division of Waste Management, 2600 Blair Stone Road, MS 4560, Tallahassee, FL 32399.

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SCALD 3 is an software option on the Franklin Fueling Systems TS-5, TS-550, TS-5000, TS-550evo, TS-5000evo, Colibri, EVO 200 and EVO 400 consoles with Magnetostrictive probe and is installed and configured as a part of those consoles. SCALD runs 24 hrs per day performing 0.2 GPH tests on tanks and manifolds at sites that do not have enough quiet time to complete static tests. The algorithm gathers data and statistically analyzes that data to complete tha 0.2 GPH tests.

Equipment Registration Certification:

To the best of my knowledge and belief, all information submitted on this form is true, accurate and complete.

Matthew Kirby, Product Support Engineer, FFS
Printed Name and Title

Matthew S. Kirby
Digitally signed by Matthew S. Kirby
DN: C=US, OU=Saco Engineering, O=Franklin Fueling Systems, CN=Matthew S. Kirby, E=kirby@franklinfueling.com
Reason: I am the author of this document
Location: Franklin Fueling Systems, Saco, Me 04072
Date: 2018-03-08 11:53:40
Foxit Reader Version: 9.0.1
Signature

3/8/2018
Date

For Department Use Only:

Date Application Received: 3/8/2018 Renew by 3/12/2023
Application complete: Yes: ✔ No: ☐

EQ- 891
Date of complete or incomplete letter sent: 3/12/2018
Date of entry to the DEP Equipment Registration List: 3/12/2018

An excerpt from the EVO 200/400 Operations Manual, 228180016 Revision 1
This description of the operation is common to all ATG systems that run SCALD3 (CITLDS).
CL6, T5, T550, T5000, T550 evo, T5000 evo, EVO 200 AND EVO 400.

SCALD®

SCALD® runs 24 hours a day performing 0.2 GPH tests on tanks at sites that do not have enough quiet tme to complete statc tests (some statc tests may take up to eight hours to complete). This test is available only if the opton for Tank Testng is enabled. This opton can be ordered when initally purchasing the console or aferwards. The part number for this opton is TS-TT for the EVO™ 200 and EVO™ 400 ATGs.

Why Continuously Test Tank Integrity?

In compliance with federal, state and local regulatory policies, all tanks must be monitored for leaks due to environmental and public safety/health concerns. Tank Integrity Tests determine whether there is a leak.

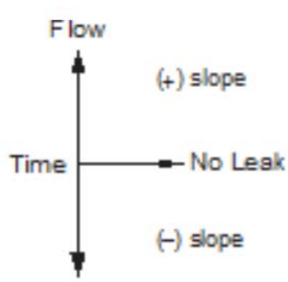
Since SCALD® contnuously runs statstcal tank leak tests during the inactve periods between product deliveries and dispensing, it is partcularly useful for:

• Operatons that are open for business on a contnuous (24 hours, 7 days a week) schedule
• Operatons that are open for business on a two-shif schedule and where deliveries may occur at any tme during non-business hours (normally schedule tank leak tests may require up to 8 hours of inactvity).

Terms

Qualify: The percentage of product that the tank is required to contain prior to testng according to the programmed "Qualify" parameter.

Slope (Tank Testng Reports): A rato of the calculated rate of change to the tme the rate is measured. Slope is affected by leaks and by many other sources of interference. A negatve slope or decrease indicates loss of product volume. A positve slope or increase indicates a rise in product volume.



Testing Requirements

To perform this test, the SCALD® sofware must be enabled. To verify that the sofware is enabled:

1. Startng at the Home screen, open the Quick Jump Menu.
2. Click System>System Informaton>Sofware Optons.
3. Under Sofware Optons, Tank Testng will appear. A “yes” in the Enabled column indicates that the sofware has been purchased and is enabled.

Test Scheduling

SCALD® works by collectng quiet intervals in-between dispensing. A “QI” is obtained when a thermally stable tank is idle for 20 minutes with no dispensing, no deliveries and no other movement of the probe floats. Once four QIs are collected, the console will analyze the data and

either Pass, Fail, Incomplete, or Abort that test. The four QIs can be collected over a period of several days or weeks.

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Test Results

Pass: A passing result ensures the integrity of the tank is good.

Fail: Test failure will be indicated by a Warning light and/ or annunciator. Additonally, a report may print (if the console is programmed to do so, see the *EVO™ 200 and EVO™ 400 Automatc Tank Gauges Programming Guide* (FFS p/n 228180015).

Abort: The result is due to variatons in float level and/ or product temperature that are outside the leak test threshold. This may be caused by:

• Dispensing
• Rapid Temperature Change
• Delivery
• Product Lower than the lowest RTD (Resistance Temperature Detector)
• Thef
• Pump Started
• Loss of Probe Signal

Incomplete:– When the test does not collect enough data before the programmed tme limit,

the
test is Incomplete. When it is necessary to obtain valid results for compliance reasons, start the test manually.

Reasons why the test might not complete

• No Quiet Time.
• SCALD® needs four 20 minute QIs in order to complete a test. These QIs are normally found in the early morning hours. If the site is so busy that there are no 20 minute periods of no dispensing, then SCALD® will not be able to complete a test.
• Temperature Instability.
• If a site is receiving deliveries frequently and the temperature of the fuel being delivered is several degrees hoter/colder then the fuel in the tank, SCALD® will not be able to collect data due to thermal instability interruptng quiet tme. The temperature of the fuel cannot change more than .01° F during a 20 minute QI.
• If a pump control relay is stuck closed and the pump is running all of the tme, the temperature in the tank may be much higher than in the other tanks. Due to this high temperature and the fact that the pump is running, no QIs will be collected.
NOTE: On rare occasions, conditons can arise that prevent SCALD® from getng enough QIs to complete a test. SCALD® from getting enough QIs to complete a test.

Evaluation of the
Franklin SCALD 3 CITLDS
Automatic Tank Gauging System
for Monthly Monitoring

Addendum for:

Franklin SCALD 3 CITLDS
Automatic Tank Gauging System
For Monthly Monitoring
September 14, 2015

Final Report

PREPARED FOR

Franklin Fueling Systems/INCON

August 25, 2017

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Evaluation of the Franklin SCALD 3 CITLDS Automatic Tank Gauging System for Monthly Monitoring

Addendum for:

Franklin SCALD 3 CITLDS
Automatic Tank Gauging System
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September 14, 2015

Final Report

PREPARED FOR

Franklin Fueling Systems/INCON

3760 Marsh Road
Madison, WI 53718

August 25, 2017

Preface

The Franklin Fueling TS-550 series and Colibri systems have been evaluated previously[1]. The Franklin Fueling Systems TS-5, TS-550, TS-5000, TS-550evo, TS-5000evo and Colibri consoles were evaluated using the Standard Test Procedures for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems", EPA/530/UST-90/006, March 1990. These evaluations meet the requirements of the U.S. Environmental Protection Agency for Automatic Tank Gauging Systems (ATGS) for Monthly Monitoring. Franklin Fueling Systems has developed a continuous version, referred to as “SCALD.” This is a new version of the existing SCALD algorithm, denoted SCALD 3. This report presents the results of the evaluation of this continuous version, SCALD 3, according to the Protocol for Continuous In-Tank Leak Detection Systems.[2]

The purpose of this addendum is to include the Franklin Fueling Evo 200 and Evo 400 consoles in this report. The Evo 200 and Evo 400 consoles are identical with the exception of the number of input channels. The Evo 200 and Evo 400 consoles both utilize the SCALD 3 CITLDS Automatic Tank Gauging System for Monthly Monitoring. The Franklin Fueling Systems Evo 400 console was evaluated in August 2017 using the Standard Test Procedures for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems", EPA/530/UST-90/006, March 1990. These evaluations meet the requirements of the U.S. Environmental Protection Agency for Automatic Tank Gauging Systems (ATGS) for Monthly Monitoring.

All testing was conducted by Ken Wilcox Associates, Inc. at the Leak Detection Test Center in Grain Valley, Missouri.

The National Work Group on Leak Detection Evaluations (NWGLDE) has accepted this protocol. All work was conducted by Ken Wilcox Associates, Inc. at the Leak Detection Test Center in Grain Valley, Missouri.

This report was prepared by Craig Wilcox, Ken Wilcox Associates, Inc. Jairus D. Flora, Jr., Ph.D., acting as a consultant to Ken Wilcox Associates, Inc., performed the statistical computations. Technical Questions regarding this evaluation should be directed to Randy Boucher, at 608-838-8786.

Approved:

H. Kendall Wilcox

H. Kendall Wilcox, Ph.D.
President

Craig Wilcox

Craig D Wilcox
Vice President

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[1] “Evaluation of the Franklin Fueling Systems TS-550 series Automatic Tank Gauge,” Ken Wilcox Associates, April, 2012.
“Testing of the Franklin Fueling Systems Colibri ATG (Model CL6, TS-CL6) ATG Controllers with The TSP-LL2 Magnetostrictive Probe”. Ken Wilcox Associates, August, 2009.

[2] “Evaluation Protocol for Continuous In-Tank Leak Detection Systems, Revision 1,” Jairus D. Flora, Jr., Ph.D., January 7, 2000.

Table of Contents

1.0 Background and Applicability

The Environmental Protection Agency's (EPA's) regulations for underground storage tanks require owners and operators to check for leaks on a routine basis using one of a number of detection methods (40DFR Part 280, Subpart D). To ensure the effectiveness of these methods, EPA set minimum performance standards for equipment used to comply with the regulations. All annual tank tightness test methods must be capable of detecting a 0.10 gallon per hour leak rate with a probability of detection of at least 0.95 (95%) and a probability of false alarm of no more than 0.05 (5%). Similarly, all monthly monitoring procedures must be capable of detecting a 0.20 gallon per hour leak rate with a probability of detection of at least 0.95 (95%) and a probability of false alarm of no more than 0.05 (5%). In addition, the criteria stipulate that the procedure must be capable of detecting a leak from any portion of the tank system that routinely contains [liquid] product. It is up to tank owners and operators to select a method of leak detection that has been shown to meet the relevant performance standards.

One mechanism for demonstrating that these performance goals have been reached is to conduct a performance evaluation using EPA's standard test procedures for leak detection equipment. The procedures for methods which involve a statistical analysis of daily inventory records taken by the tank owner/operator are described in the test protocol "Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods (EPA Document Number EPA/530/UST-90/007 Dated June 1990),

Franklin Fueling Systems Inc. has developed a new Continuous In-Tank Leak Detection System (CITLDS) system, called SCALD 3. CITLDS methods collect data whenever the tank is not actively dispensing or receiving liquid product. These data are subjected to tests to determine whether the tank is stable and then the data from these periods of varying lengths are combined with a statistical procedure to produce an overall average leak rate and standard error. These statistics are compared with an appropriate threshold to determine whether there is significant evidence of a leak. If there is no significant evidence of a leak and the data meet specified quality requirements, the conclusion of tight is reached. Generally these methods are monthly monitoring methods; however, some of them are capable of detecting leaks as small as required by the annual test (0.1 gallon per hour) with a PFA of 5% and a PD of 95%.

2.0 Description of the Franklin Fueling Systems SCALD 3

This SCALD 3 system is designed to work with data collected by an automatic tank gauge. If there is no statistical evidence leading to the conclusion that there is a leak, the detectable leak rate is determined and compared with the EPA standard. If the minimum detectable leak (MDL) rate is less than the required standard and there is no statistically significant evidence of a leak, the conclusion is that the tank is tight.

3.0 Description of Testing Location

The Franklin Fueling Systems SCALD 3 evaluation was conducted at the Fuels Management Research Center (FMRC) located in Grain Valley, Missouri. Ken Wilcox Associates, Inc. constructed the FMRC in 1996.

For this evaluation, a data base of records was obtained by KWA and used to randomly select a set of records for use in the evaluation. Once these records were selected, they were randomly assigned to nominal leak rates of zero (tight), 0.1, 0.2, and 0.3 gph. A small random difference (either positive or negative) was added to the nominal leak rates and the resulting leak rates were induced in the selected inventory records.

After this database was prepared, it was submitted Franklin's CITLDS program SCALD 3, which analyzed the (modified) records with their CITLDS to estimate the leak rates.

Then the resulting data set was analyzed by KWA to compare the estimated leak rates with those that were induced into the data. Based on this comparison, the performance of the SCALD 3 system was estimated in terms of the probability of false alarm (PFA) and probability of detection (PD).

4.0 Overview of Evaluation Procedure

A brief description of the evaluation procedure is as follows.

1. KWA obtained a large database of records that used to randomly select 45 records for use in the CITLDS evaluation.

2. The selected records were randomly allocated to 4 groups for inducing nominal leak rates of 0, 0.1, 0.2, and 0.3 gallon per hour.

3. The nominal leak rates were randomly adjusted by small amounts and the resulting leak rates induced in the inventory records.

4. The database was submitted to Franklin's CITLDS SCALD 3 program for analysis.

5. Using Franklin's CITLDS program, SCALD 3, KWA analyzed the data records with the algorithms.

6. The resulting data (measured leak rates minus induced leak rates) were analyzed by KWA and the performance was estimated.

5.0 Data Analysis

5.1 Characteristics of the Population of Records

The distribution of the tank records by manifold, product, and season is shown in Table 1.

Table 1 Distribution of Tests

	Number of Records	Percent
Single tanks	21	46.7
Manifold systems (2 tanks)	24	53.3
Diesel	14	31.1
Gasoline	31	68.9
Total	45	100

The distribution of the inventory records by the tank size (capacity) and monthly sales (throughput) are summarized in Table 2.

Table 2 Tank Size and Throughput

	Size (gallons)	Sales (gallons)
Minimum	3990	1315
25th	8438	20876
50th	16279	75456
75th	16279	102690
80th	17110	105762
Maximum	32891	445408

5.2 Tank Results

For the CITLDS tests the differences between the measured and induced leaks were calculated. The mean difference (bias) was -0.0025 gal/h. The standard deviation was 0.0216 gal/h. No tests were reported as inconclusive. Based on the 45 valid tests, the t-statistic for bias was -0.78 with 44 degrees of freedom. This was not statistically significant (P=0.44), so the bias was not statistically significant.

Based on these results, using a threshold of 0.1 gal/h the probability of false alarm (PFA) is 0.0017%. The probability of detecting a leak rate of 0.2 gal/h is 99.998%. The minimum detectable leak rate (MDL) with a PD of 95% is 0.136 gal/h.

The previous results are summarized in Table 3. The statistics are all based on the 45 valid test results.

Table 3. Combined Results

Number of records	45

Number of valid results	45
Mean Difference	-0.00253 gal/h
Standard deviation	0.0216 gal/h
Variance	0.0004684 $(gal/h)^2$
Mean Squared Error (MSE)	0.0004747 $(gal/h)^2$
t-Bias	-0.783
P-Value for bias	0.438 (NS)
Threshold	0.1 gal/h
t-PFA	4.62
P-Value for PFA	0.00167%
PD(0.2)	99.998%
MDL (for 95% PD)	0.136 gal/h

Based on these results, overall using a threshold of 0.1 gal/h, the SCALD 3 system **does** meet the "monthly" standard for leak detection of having a PFA of 5% or less and a PD of 95% or greater for detecting a leak rate of 0.2 gal/h.

5.2.1 Comparison of Single and Manifold System Results

Among the test records, there were 21 single tanks, and 24 manifold records. The manifold systems consisted of two-tank manifolds of various sizes. The results for the single and manifold tank records were compared and are summarized in Table 4. As can be seen in Table 4, there was no significant difference in the means or bias, however, there was a significant difference in the variability between the two groups, with the manifold tank results showing more variability than the single tank results. As a result, the results for single and manifold tanks need to be reported separately. These results are shown in Table 4.

As is shown in Table 4, the SCALD 3 system met the U.S. EPA monthly standard for both single and manifold tanks, but there was a significant difference in performance between single and manifold tanks. There was no statistically significant difference in the bias between single and manifold tanks, however, the manifold tank results were significantly more variable than those for single tanks. As a consequence, the performance results are reported separately.

Table 4. Comparison of Single and Manifold System Results

	Single	Manifold
Number	21	24
Mean (Bias)	0.00343 gal/h	-0.00774 gal/h
Standard Deviation	0.01486 gal/h	0.02536 gal/h
Comparison		P-value
T-test for means	0.08378	0.9336 (NS)
F-test for variability	2.911	0.00935 (SIG)
Threshold	0.16	0.135
PFA	<0.001%	0.001%
PD(0.2)	99.3%	99.1%
MDL	0.186 gal/h	0.198 gal/h
Alternative Threshold	0.17	0.155
PFA	<0.001%	<0.001%
PD(0.2)	97.1%	95.5%
MDL	0.196 gal/h	0.178 gal/h

The manifold tank systems were all between 7,492 and 32,891 gallons. They had throughputs ranging from 19,081 to 250,850 gallons per month. Use of the SCALD 3 system on manifold tank systems with up to 3 tanks containing up to 32,891 gallons and up to 445,408 gallons a month of throughput is justified.

The single tanks were between 3,990 and 19,951 gallons. They had throughputs ranging from 1,315 to 445,408 gallons per month. Use of the SCALD 3 system on single tank systems up to 32,891 gallons in volume and up to 445,408 gallons per month in throughput is justified. Note that although the single and multiple tank results differed in variability, the multiple tank results were more variable and also had the larger tank volumes. This justifies using the same limits on tank size (of 32,891 gallons, the maximum) and throughput (of 445,408 gallons per month, the maximum) for both single and manifold tanks.

5.2.2 Comparison by Tank Size

The tests were divided at the median tank size of 15,160 gallons. There were 22 records from tanks smaller than 15,160 gallons and 23 records from tanks larger than 15,160 gallons. The comparison of results for the small and large tanks is shown in Table 5.

There was no statistically significant difference in the means for the small and large tank records. There was also no statistically significant difference in the variance for the results from the small and large tanks with the large tanks showing more variability. Consequently, there is justification for extending the results to tanks 1.5 times the volume of the 80th percentile of the tank sizes in the tank leak evaluation or the maximum tank size. The 80th percentile of tank sizes of the records used for the tank leak evaluation that had valid data was 17,110 gallons and the maximum tank size was 32,891, so the results may be extended to tanks of 32,891 gallons or smaller.

Table 5. Comparison of Small and Large Tank Results

	Small (<15,160 g)	Large (>15,160g)
Number	22	23
Mean	-0.00796 gal/h	0.002669 gal/h
Standard Deviation	0.01721 gal/h	0.02442 gal/h
Comparison		
T-test for means	0.100	0.92 (NS)
F-test for variability	2.014	0.114 (NS)

5.2.3 Comparison by Throughput

The tank records were divided at the median throughput to compare the results for large and small throughputs. The median throughput was 75,456 gallons per month (g/m). There were 23 valid records with throughputs up to the median and 22 valid records with throughputs larger than the median. The comparison of results for high and low throughput tanks is used to determine limitations on the throughput. The comparison of results is shown in Table 6.

Table 6. Comparison of Low and High Throughput Results

	Low (<=75,456g/m)	High (>75,456g/m)
Number	23	22
Mean	-0.0034 gal/h	-0.0016 gal/h
Standard Deviation	0.018 gal/h	0.0253 gal/h
	Statistic	P-value
T-test for means	0.785	0.437 (NS)
F-test for variability	1.965	0.123 (NS)

There was no statistically significant difference in the performance of the method for low or high throughput records.

Since the results for high and low throughput tanks did not differ significantly, the results extended to 1.50 times the 80th percentile of the throughputs (or the maximum throughput used in the evaluation). (The 80th percentile of the throughputs was 105,762 gallons per month and the maximum was 445,408 gallons per month. The limit is the larger of 158,643 gallons per month or 445,408 gallons per month, the maximum throughput. Since the maximum throughput was larger, it would be used as the limitation; that is, 445,408 gallons per month. There were 6 records with throughputs from about 200,000 gal/month to the maximum of 445,408 gal/month. Five of the six highest throughputs were less than 251,000 gallons per month, with a single record at the maximum. Inspection of these data showed that their standard deviation was small enough to meet the EPA monthly standard, so extension to the maximum throughput is justified. (That record did not have an unusually large error.)

5.2.4 Comparison of Results by Product

There were two products in the inventory data: diesel (No. 2) and gasoline (regular unleaded and premium unleaded). There was a statistically significant difference in the bias for gasoline compared to diesel. There was no statistically significant difference in the variability of the tests for the two products. It is not clear whether this is a result of the difference in the product, or some association of product with other factors. However, both products easily meet the EPA standard. The details are shown in Table 7.

Table 7. Comparison of Results by Product

	Diesel	Gasoline (all grades)
Number	14	31
Mean	0.01348 gal/h	-0.00975 gal/h
Standard Deviation	0.0178 gal/h	0.01939 gal/h
	Statistic	P-value
T-test for means	3.81	0.000435 (Sig)
F-test for variability	1.18	0.387 (NS)

5.2.5 Comparison of Results by Season

Twenty of the 45 valid test results were from cold months; 14 were from mild weather months, and 11 were from hot weather months. The performance was compared for the three different seasonal conditions using an analysis of variance. The mean and standard deviation of the difference between the measured and reported leak rates is reported in Table 8.

Table 8. Comparison of Results by Season

Weather condition	Number of tests	Mean	Standard deviation
Cold	20	-0.0088 gal/h	0.0246 gal/h
Mild	14	0.0047 gal/h	0.0083 gal/h
Hot	11	-0.0001 gal/h	0.0258 gal/h

An analysis of variance showed that there was no statistically significant difference among the means at the 5% significance level ($F=1.694$, $P=0.197$). However, the F max test gave a value of 9.72 for the ratio of the largest variance to the smallest, which was statistically significant ($P<0.0001$). Thus, there was a statistically significant difference in performance for the different seasons. Inspection of the standard deviations showed that the variability was smallest during mild weather. All of the standard deviations were small enough to meet the EPA standard.

6.0 Performance Parameters and Limitations of the Franklin Fueling SCALD 3 System

The overall performance parameters and limitations for the SCALD 3 CITLDS method (denoted as SCALD 3 CITLDS) are presented in Table 8. Note that since there was a significant difference in performance between the single and manifold tank systems, the results are reported separately for single and manifold tanks.

Table 8. Performance Parameters and Limitations for Franklin Fueling SCALD 3

Parameter	
Basic Information	
Maximum Tank Size	32,891 gallons
Maximum Allowable Monthly Throughput	445,408 gallons/month
Average Data Collection Time per Test	16.42 hours
Product	gasoline or diesel
Number of Tanks in manifold	up to 3
Statistical Information	
Single Tanks	
Standard Deviation	0.0149 gal/h
Variance	0.00022 $(gal/h)^2$
Bias	0.00344 gal/h
Mean Squared Error	0.000233 $(gal/h)^2$
Manifold Tanks	
Standard Deviation	0.02536 gal/h
Variance	0.000643 $(gal/h)^2$
Bias	-0.00774 gal/h
Mean Squared Error	0.000703 $(gal/h)^2$
Monthly Monitoring (Single)	
Threshold	0.16 gal/h
Probability of False Alarm	<0.0001%
Probability of Detection of 0.2 gal/hr	99.3%
Minimum Detectable Leak Rate	0.186 gal/h
Alternative Threshold	0.17 gal/h
Probability of False Alarm	<0.001%
Probability of Detection of 0.2 gal/hr	97.1%
Minimum Detectable Leak Rate	0.196 gal/h
Monthly Monitoring (Manifold)	
Threshold	0.135 gal/h
Probability of False Alarm	<0.001%
Probability of Detection of 0.2 gal/hr	99.1%
Minimum Detectable Leak Rate	0.178 gal/h
Alternative Threshold	0.155 gal/h
Probability of False Alarm	<0.001%
Probability of Detection of 0.2 gal/hr	95.5%
Minimum Detectable Leak Rate	0.198 gal/h

7.0 Conclusions

1. The CITLDS method meets the EPA Criterion of detecting a leak rate of 0.2 gal/h with a PD of at least 95%, while operating with a PFA of less than 5%.
2. There was no statistically significant difference in the performance for large and small tanks, so the CITLDS system can be used on tank systems up to 32,891 gallons.
3. There was no statistically significant difference in the performance for high and low throughputs, so the CITLDS system can be used on tank systems with up to the maximum observed throughput of 445,408 gallons per month.
4. The combined standard deviation was 0.0216 gal/h.
5. The PFA based on combined data was 0.0017%.
6. While there was no significant difference in the bias for single compared to multiple tank systems, there was a significant difference in variability. Both meet the EPA standards for monthly monitoring and annual testing. However, Franklin Fueling has chosen to implement them separately.
7. Using a threshold of 0.16 gal/h, the PFA for single tank systems was less than 0.001%, while the PD for detecting a leak rate of 0.2 gal/h was 99.3%.
8. Using a threshold of 0.17 gal/h, the PFA for single tank systems was less than 0.001%, while the PD for detecting a leak rate of 0.2 gal/h was 97.1%.
9. Using a threshold of 0.135gal/h, the PFA for manifold tank systems was les than 0.001%, while the PD for detecting a leak rate of 0.2 gal/h was 99.1%.
10. Using a threshold of 0.155 gal/h, the PFA for manifold tank systems was les than 0.001%, while the PD for detecting a leak rate of 0.2 gal/h was 95.5%.

8.0 Executive Summary SCALD 3 CITLDS Evaluation

Ken Wilcox, Associates, Inc. (KWA), acting as an independent third party, conducted an evaluation of the SCALD system for Franklin Fueling. The evaluation was conducted from June of 2013 through June of 2014. The data were collected from operating tanks from February through July of 1999 and May of 2014 through February of 2015. The CITLDS is an ATG type of continuous monitoring method of leak detection.

EVALUATION DATA

The evaluation used data selected from a database with 11 tanks at 10 sites. The sites were located in 8 states and included 45 tank records. The data collected covered the period of February through July of 1999 and May of 2014 through February of 2015. The available database is documented in Table A1 of the data reporting tables. Table A1 includes information on the tank characteristics including manifolds, vapor recovery, etc. The test data were from the periods as indicated in Table A2. In Table A2, the test numbers correspond to tank period numbers in Table A1. KWA personnel selected the database of 45 tank records. KWA then assigned leak rates at random to these records after stratifying on single vs. manifold tanks, tank size, throughput, etc. After KWA assigned leak rates, KWA supervised Franklin Fueling staff in inducing the simulated leaks, then supervised other Franklin Fueling staff in running the CITLDS program to analyze and report the results. After the results were available, KWA staff analyzed them.

Evidence that the tanks were tight was provided by monthly ATG tests using existing ATG systems previously evaluated and installed in the tanks. The sites were selected by the vendor to give a good geographical representation and by sites volunteering to participate. A Franklin Fueling CITLDS continuous ATG system made by Franklin Fueling was installed at each site. The evaluating organization visited the vendor's site and selected the test data from the large database of CITLDS data that the vendor maintains. The evaluating organization then supervised one of the vendor's staff in inducing leaks and then observed another staff member running the CITLDS program on the selected data sets.

LEAK SIMULATION

The leak simulation was done by introducing a volume change corresponding to the induced leak rate. This volume was computed for each time interval between data recorded by the CITLDS system. The volume was converted to a level change by the use of custom tank charts supplied by the tank manufacturer for each of the tank records used. The data records for simulated leaks were modified using an algorithm developed by Franklin Fueling (Vendor).

STATISTICAL RESULTS

The statistical results that are reported depend on whether the SCALD 3 CITLDS is a quantitative or a qualitative system. The Franklin Fueling SCALD 3 CITLDS system is a quantitative system.

Variable Leaks

When variable leak rates were introduced, the difference between the measured leak rate when a constant or variable leak rate was applied was very small—0.00502 gal/hr. The average estimated variable leak was larger than the estimated constant leak rate, and barely statistically significantly different from zero ($t=2.09$, $P=0.043$).

Appendix A
Standard Results Forms for Alternative Test Procedures

Results of Alternative Evaluation

Continuous In-Tank Leak Detection System (CITLDS)

This form tells whether the continuous leak detection system (CITLDS) described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the Continuous Leak Detection System Evaluation Protocol. This protocol is deemed equivalent in stringency to the EPA Evaluation Protocols. The full evaluation report also includes a form describing the method and a form summarizing the test data.

Tank owners using this leak detection system should keep this form on file to prove compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

CITLDS Description

Name: SCALD 3

Version Number: TS-5, TS-550, TS-5000, TS-550evo, TS-5000evo, Evo 200, Evo 400 and Colibri

Vendor: Franklin Fueling

3760 Marsh Road
(street address)

Madison WI 53718 (608) 838-8786
(city) (state) (zip) (phone)

Evaluation Results

Quantitative Results For Tank Leak Simulation (Complete this section based on the tank leak simulation data if the CITLDS reports a leak rate. If this section is not applicable, check here G and leave the section blank.)

This CITLDS declares a tank to be leaking when the measured leak rate exceeds a threshold. The threshold, probability of false alarm, PFA, and probability of detection, PD, of detecting an average leak rate of 0.20 gallon per hour or 150 gallons per month, are given in the table below.

Threshold	Probability of False Alarm (PFA)	Probability of Detection
	Single Tanks	
0.16	<0.001%	99.3% PD of 0.2 gph
0.17	<0.001%	97.1% PD of 0.2 gph
	Manifold Systems (up to 3)	
0.135	<0.001%	99.1% PD of 0.2 gph
0.155	<0.001%	95.5% PD of 0.2 gph

In the combined data, the mean difference between the measured and reported leak rate was -0.0025 gph. The standard deviation was 0.0216 gph.

Any results that were invalid due to operational difficulties are to be reported. If the data included any invalid results, record that fact here. If not, indicate that. There were 0 invalid results out of 45 records in the data, or 0%. This means that the system may not provide a conclusive test result 0% of the time. There was 1 invalid result in the variable leak rate test, which was 2.2% of the data.

If the CITLDS has a water detection function, complete the following:

The minimum water level (threshold) in the tank that the CITLDS can detect is 0.201 inch.
The minimum change in water level that can be detected by the CITLDS is 0.011 inch.

Quantitative Results for Line Leak Simulation (Complete this section based on the line leak simulation data if the CITLDS reports a leak rate. If this section is not applicable, check here X and leave the section blank.)

This CITLDS declares a tank system to be leaking when the measured leak rate exceeds a threshold. The threshold, probability of false alarm, PFA, and probability of detection, PD, of detecting an average leak rate of 0.20 gallon per hour or 150 gallons per month, are given in the table below.

The mean difference between the measured and reported leak rate was _____gph. The standard deviation was _____ gph.

Threshold	Probability of False Alarm (PFA)	Probability of Detection (PD) of leak 0.2 gph

Any results that were invalid due to operational difficulties are to be reported. If the data included any invalid results, record that fact here. If not, indicate that. There were 0 invalid results out of 72 records in the data, or 0 %. This means that the system may not provide a conclusive test result 0 % of the time.

Qualitative Results for Tank Leak Simulation (Complete this section based on the tank leak simulation data if the CITLDS reports on a pass/fail basis. If this section is not applicable, check here **X** and leave the section blank.)

	Reported			
Actual Status	Tight	Leaking	Invalid	Total
Tight				
Leaking				

The estimated PFA was _____ with a 95% confidence interval from _____ to _____.

The estimated PD for detecting a leak rate of 0.20 gallon per hour (150 gallons per month) was _____ with a 95% confidence interval from _____ to _____.

Any results that were invalid due to operational difficulties are to be reported. If the data included any invalid results, record that fact here. If not, indicate that. There were ____ invalid results out of ____ records in the data, or ____%. This means that the system may not provide a conclusive test result ____% of the time.

Qualitative Results for Line Leak Simulation (Complete this section based on the line leak simulation data if the CITLDS reports on a pass/fail basis. If this section is not applicable, check here **X** and leave the section blank.)

	Reported			
Actual Status	Tight	Leaking	Invalid	Total
Tight				
Leaking				

The estimated PFA was _____ with a 95% confidence interval from _____ to _____.

The estimated PD for detecting a leak rate of 0.20 gallon per hour (150 gallons per month) was _____ with a 95% confidence interval from _____ to _____.

Any results that were invalid due to operational difficulties are to be reported. If the data included any invalid results, record that fact here. If not, indicate that. There were ____ invalid results out of ____ records in the data, or ____%. This means that the system may not provide a conclusive test result ____% of the time.

Automatic Monthly Inventory Control Results (If the system is an automatic monthly inventory control system, enter the results in this section. If there is no monthly inventory control function, check here **X** and leave this section blank.)

The mean of the monthly inventory reconciliations was ______ gallons per month. The standard deviation was ______ gallons per month. Using the EPA action level of 1% of throughput plus 130 gallons gave the estimated false alarm rate reported below. Also reported is the smallest loss that could be detected with 95% probability using the EPA threshold.

Threshold	Probability of False Alarm (PFA)	Size of Leak Detected with a PD of 95%

Test Conditions During Evaluation

The data evaluation set included data from tanks of the following sizes:

Percentile of Records	Min.	25	Median 50	75	80	Max.
Tank Size (gal)	3,990	8,438	16,279	16,279	17,110	32,891

The tanks had various monthly throughputs:

Percentile of Records	Min.	25	Median 50	75	80	Max.
Monthly throughput (gal)	1,315	20,876	75,456	102,690	105,762	445,408

The temperature difference between product added to fill the tanks and product already in the tank ranged from -26.9 ºF to +16.9 ºF, with a standard deviation of 5.02 ºF.

The tests were conducted with the tank product levels ranging from 7.3 % to 97.8 % full.

The duration of the CITLDS tests ranged from 5 days to 26 days, with an average duration of 8.2 days (specify appropriate time units, e.g., day or hours).

The system correctly identified 9 leaks of 9 simulated leaks in the 1 to 10 gph range. Note: must be 100% in this range to be acceptable.

For a quantitative system, enter the average difference between the estimated leak rate with a variable simulated leaks minus the estimated rate with a constant simulated leak was 0.0005 gph. This difference must be greater than or equal to zero for the system to be acceptable. For a qualitative system, enter the number of leaks identified with variable leak rates ____ and the number identified with constant leak rates . The number with variable leak rates must be at least as large as the number with constant leak rates.

Based on the results reported on pages 1 and 2 of this form, the reported method (X) does (__) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency of an average leak rate of 0.20 gallon per hour or 150 gallons per month from X a tank ___ or lines (mark applicable boxes) at PD of 95% and PFA of 5%.

Limitations on the Results

The performance estimates above are only valid when:

The method has not been substantially changed.

The vendor's instructions for installing and operating the CITLDS are followed.

The tank contains a product identified on the method description form.

The single tank and manifold tank volume is no larger than 32,891 gallons.

The data records cover 26 days or more.

The monthly throughput is up to 445,408 gallons (single and manifold).

The difference in temperature between product in the tank and that delivered is 5.02 ºF or less.

The system X may or ___ may not be used for manifold tank systems. If the system may be used for manifold tank systems, check here if there was no significant difference in performance between single and manifold tank systems. If there was a significant difference, enter the PD and PFA for the two types of systems here:

System	PFA	PD
Single Tanks (using 0.16 gph threshold) Using 0.17 gph threshold	<0.001% <0.001%	99.3% (of 0.2 gph) 97.1% (of 0.2 gph)
Manifold (2 or 3) (using 0.135 gph threshold) Using 0.155 gph threshold	<0.001% <0.001%	99.1% (of 0.2 gph) 95.5% (of 0.2 gph)

The minimum product level for the system is 7.3% of the tank volume. The maximum product level for the system is 97.8 % of the tank volume.

Other limitations specified by the vendor or determined during testing:

> **Safety disclaimer: This test procedure only addresses the issue of the method's ability to detect leaks.**

Certification of Results

I certify that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to the proposed test procedure for Continuous Leak Detection Systems. In particular, the requirements summarized in Section 6.4 for the data base and in Section 7.8 for the data analysis were followed. Any exceptions are noted below:

Exceptions to Sections 6.4 and 7.8. If none, state "None."

None

This test procedure is deemed equivalently stringent to EPA published evaluation protocols.

Craig D. Wilcox	Ken Wilcox Associates, Inc.
(printed name)	(organization performing evaluation)
Craig Wilcox	Grain Valley, MO 64029
(signature)	(city, state, zip)
August 25, 2017	(816) 443-2494
(date)	(phone)

Description
Continuous Leak Detection System

This section describes briefly the important aspects of the continuous leak detection system (CITLDS). It is not intended to provide a thorough description of the principles behind the method or how the equipment works.

CITLDS Name and Version

Franklin Fueling Systems SCALD 3

Product

> Product type

For what products can this method be used? (Check all applicable)

(X) gasoline

(X) Diesel

(X) aviation fuel

(X) fuel oil #4

( ) fuel oil #6

(X) solvents

( ) waste oil

(X) other (list) Biodiesel blends B6-B20 meeting ASTM D7647, biodiesel B100 meeting ASTM D6751 and other liquids with known coefficients of expansion and density may be tested after consultation with the manufacture. Ethanol and ethanol-gasoline blends.

What product level is required to conduct a test?

( ) greater than 90% full

( ) greater than 50% full

(X) other (specify) greater than 14% full

Does the CITLDS measure inflow of water as well as loss of product (gallon per hour)?

( ) yes

(X) no

Does the CITLDS detect the presence of water in the bottom of the tank?

(X) yes

( ) no

Level Measurement

What technique is used to measure changes in product volume?

( ) directly measures the volume of product change

( ) changes in head pressure

( ) changes in buoyancy of a probe

( ) mechanical level measure (e.g., ruler, dipstick)

( ) changes in capacitance

( ) ultrasonic

(X) change in level of float (specify principle, e.g., capacitance, magnetostrictive load cell, etc.) Magnetostrictive ____________________

( ) other (describe briefly) ______________________________

Temperature Measurement

If product temperature is measured during a test, how many temperature sensors are used?

( ) single sensor, without circulation

( ) single sensor, with circulation

( ) 2-4 sensors

(X) 5 or more sensors

( ) temperature averaging probe

If product temperature is measured during a test, what type of sensor is used?

( ) resistance temperature detector (RTD)

( ) bimetallic strip

( ) quartz crystal

(X) thermistor

( ) other (describe briefly) ______________________________

If product temperature is not measured during a test, why not?

( ) the factor measured for change in level/volume is independent of temperature (e.g., mass)

( ) the factor measured for change in level/volume self-compensates for changes in temperature

( ) other (explain briefly) ____

Data Acquisition

What data does the CITLDS collect and analyze for its test? (Check all that apply)

(X) product level

(X) product temperature

(X) time

(X) product deliveries

( ) dispensing records

( ) other (specify) ____

Procedure Information

> Waiting Times

What is the minimum waiting period between adding a large volume of product to bring the level to test requirements and the beginning of the test (e.g., from 50% to 95% capacity)?

(X) no waiting period (The algorithm tests the data for stability and discards those before the tank is stable.)

( ) less than 3 hours

( ) 3-6 hours

( ) 7-12 hours

( ) more than 12 hours

( ) variable, depending on tank size, amount added, temperature stability, etc.

> Test duration

What is the typical time required for the CITLDS to acquire enough data for a valid test?

__5-26__ days

What factors influence the time required for the CITLDS to acquire and analyze enough data for a valid test?

Product Surface Stabilization Time

What is the sampling frequency for the level and temperature measurements

( ) more than once per second

(X) at least once per minute

( ) every 1-15 minutes

( ) every 16-30 minutes

( ) every 31-60 minutes

( ) less than once per hour

( ) variable

> Identifying and correcting for interfering factors

How does the CITLDS determine the presence and level of the ground water above the bottom of the tank?

( ) observation well near tank

( ) information from USGS, etc.

( ) information from personnel on-site

(X) presence of water in the tank

( ) other (describe briefly) ____

( ) level of ground water above bottom of the tank not determined

How does the CITLDS correct for the interference due to the presence of ground water above the bottom of the tank?

( ) system tests for water incursion

( ) different product levels tested and leak rates compared

( ) other (describe briefly) ____

(X) no action

How does the test CITLDS determine when tank deformation has stopped following delivery of product?

( ) wait a specified period of time before beginning test

(X) watch the data trends and begin test when decrease in product level has stopped

( ) other (describe briefly) ____________________________________

Are the temperature and level sensors calibrated before each use?
( ) yes

(X) no

If not, how often are the sensors calibrated?

( ) weekly

( ) monthly

( ) yearly or less frequently

(X) never

How does the CITLDS compensate for the effects of product evaporation on product level following dispensing of product from the tank?

( ) wait a specified period of time after dispensing before beginning test

(X) watch the data trends and begin test when decrease in product level has stopped

( ) other (describe briefly) ____

( ) no compensation

> Interpreting test results

How are level changes converted to volume changes (i.e., how is height-to-volume conversion factor determined)?

( ) actual level changes observed when know volume is added or removed (e.g. liquid, metal bar)

(X) theoretical ratio calculated from tank geometry

(X) interpolation from tank manufacturer's chart

( ) other (describe briefly) ____

( ) not applicable; volume measured directly

How is the coefficient of thermal expansion (Ce) of the product determined?

( ) actual sample taken for each test and Ce determined from specific gravity

( ) value supplied by vendor of product

(X) average value for type of product

(X) other (describe briefly) Or alternative use of optional density sensor

How is the leak rate (gallon per hour) calculated?

( ) average of subsets of all data collected

( ) difference between first and last data collected

( ) from data of last ____ hours of test period

(X) from data determined valid by statistical analysis

( ) other (describe briefly) ____

Is the leak status reported in terms of a leak rate (e.g., gal/h or gal/day)

(X) yes

( ) no

( ) if the answer to the above question is "no", how are the results reported?

Explain ______A Pass or Fail indication is also given

What threshold value for product volume change (gallon per hour) is used to declare that a tank is leaking?

( ) 0.05 gallon per hour

( ) 0.10 gallon per hour

( ) 0.15 gallon per hour

(X) other (list) _0.16 or 0.17 gallon per hour (single tanks), 0.135 or 0.155 gallon per hour (manifolds)

Under what conditions are test results considered inconclusive?

(X) too much variability in the data (standard deviation beyond a given value)

( ) unexplained product volume increase

( ) other (describe briefly) ______________________________________

Exceptions

Are there any conditions under which a test should not be conducted?

( ) water in excavation zone

( ) large difference between ground temperature and delivered product temperature

(X) extremely high or low ambient temperature

( ) invalid for some products (specify) ______________________________

( ) other (describe briefly) ____

What are acceptable deviations from the standard testing protocol?

(X) none

( ) lengthen the duration of test

( ) other (describe briefly) ____

What elements of the test procedure are determined by testing personnel on-site?

( ) product level when test is conducted

( ) when to conduct test

( ) waiting period between filling tank and beginning test

( ) length of test

( ) determination that tank deformation has subsided

( ) determination of "outlier" data that may be discarded

( ) other (describe briefly) ____

(X) none

Appendix B

Test and Tank Data Tables

SCALD 3 Leak Test Data

Test #	Tank Size	First Start	Last Start	Total Hours	No. Del	Site	Device	Result	Ind LR	Rep LR
1	9695	1/25/2015 7:04	2/8/2015 11:00	6.47	16	GA1	Tank1	Pass	0.0000	0.0178
6	4219+4219	8/13/2014 12:58	8/19/2014 11:34	33.96	1	IL1	Manifold3	FAIL	0.2751	0.2730
8	4219+4219	8/25/2014 15:47	8/30/2014 15:58	23.00	3	IL1	Manifold3	Pass	0.0935	0.0970
9	4219+4219	8/30/2014 23:11	9/4/2014 14:37	36.06	2	IL1	Manifold3	Pass	0.0000	-0.0091
10	4219+4219	9/4/2014 17:49	9/9/2014 10:44	34.40	1	IL1	Manifold3	FAIL	0.1870	0.1847
11	4219+4219	9/9/2014 17:32	9/14/2014 11:23	35.35	2	IL1	Manifold3	FAIL	0.3040	0.3017
12	4219+4219	9/14/2014 23:10	9/20/2014 11:35	24.47	2	IL1	Manifold3	Pass	0.1083	0.1065
13	19951	1/29/2015 6:39	2/12/2015 9:11	8.64	31	TX1	Tank1	FAIL	0.3049	0.2836
27	3990	1/17/2015 0:45	1/21/2015 13:23	46.65	0	MO1	Tank2	FAIL	0.3225	0.3316
28	3990	1/21/2015 15:22	1/26/2015 16:32	56.01	0	MO1	Tank2	FAIL	0.2744	0.2839
29	3990	1/26/2015 18:40	2/3/2015 0:06	46.92	1	MO1	Tank2	FAIL	0.1931	0.1988
30	3990	2/3/2015 0:47	2/8/2015 11:22	47.48	0	MO1	Tank2	Pass	0.0000	0.0130
31	3990	2/8/2015 12:50	2/13/2015 14:22	43.77	0	MO1	Tank2	Pass	0.0999	0.1150
32	3990	2/13/2015 15:38	2/25/2015 11:32	9.04	0	MO1	Tank2	FAIL	0.2125	0.2212
33	16279	7/31/2014 7:07	8/4/2014 9:21	10.49	2	MO1	Tank3	Pass	0.0000	-0.0288
34	16279	8/7/2014 2:33	8/10/2014 12:06	6.63	3	MO1	Tank3	FAIL	0.2100	0.2080
35	16279	8/12/2014 22:27	8/24/2014 21:51	6.28	6	MO1	Tank3	Pass	0.0000	-0.0167
37	16279	9/4/2014 1:26	9/10/2014 10:26	6.44	4	MO1	Tank3	Pass	0.0000	0.0108
38	16279	9/13/2014 7:48	9/16/2014 7:26	7.42	4	MO1	Tank3	Pass	0.0994	0.0652
39	16279	9/17/2014 22:02	9/21/2014 10:31	7.22	4	MO1	Tank3	FAIL	0.2049	0.1979
40	16279	9/24/2014 0:08	9/29/2014 4:24	8.43	4	MO1	Tank3	Pass	0.1042	0.0916
41	16279	9/30/2014 2:24	10/4/2014 6:21	7.75	3	MO1	Tank3	Pass	0.0000	-0.0138
42	16279	10/4/2014 8:52	10/9/2014 17:17	11.67	3	MO1	Tank3	Pass	0.1025	0.1024
43	16279	10/11/2014 23:54	10/19/2014 9:59	19.12	5	MO1	Tank3	Pass	0.0000	0.0014
44	16279	10/19/2014 22:53	10/26/2014 2:39	9.34	4	MO1	Tank3	Pass	0.0000	-0.0148
45	16279	10/26/2014 5:44	10/29/2014 17:09	11.71	5	MO1	Tank3	Pass	0.0000	-0.0138
46	16279	11/3/2014 0:37	11/6/2014 12:45	6.07	4	MO1	Tank3	FAIL	0.3019	0.3037
47	15246+15246	7/28/2014 5:07	8/10/2014 7:57	8.71	14	IN1	Manifold1	FAIL	0.2005	0.2447
48	15246+15246	8/14/2014 4:48	8/25/2014 7:25	7.06	14	IN1	Manifold1	Pass	0.0000	0.0458
49	15246+15246	1/19/2015 5:17	2/12/2015 6:13	21.97	27	IN1	Manifold1	FAIL	0.1841	0.1626
51	1595+5897	12/25/2014 10:31	1/18/2015 9:34	6.33	16	IN2	Manifold1	FAIL	0.3163	0.3477
84	12160+20731	7/7/1999 23:08	7/18/1999 18:28	6.67	15	SC1	Manifold1	FAIL	0.2743	0.2155
85	6017+8023	2/9/1999 5:08	2/13/1999 15:04	6.51	1	SC2	Manifold1	Pass	0.0969	0.0849
86	6017+8023	2/14/1999 0:04	2/18/1999 22:06	14.16	1	SC2	Manifold1	FAIL	0.2005	0.2483
87	6017+8023	2/18/1999 23:15	2/25/1999 1:10	13.44	1	SC2	Manifold1	Pass	0.0000	0.0287
88	6017+8023	2/27/1999 4:53	3/2/1999 5:27	7.66	2	SC2	Manifold1	Pass	0.0000	0.0445
89	6017+8023	3/2/1999 6:26	3/6/1999 7:08	17.78	1	SC2	Manifold1	Pass	0.0000	-0.0071
90	6017+8023	5/6/1999 6:19	5/10/1999 10:38	11.01	0	SC2	Manifold1	Pass	0.0980	0.0959
91	6017+8023	5/11/1999 0:42	5/14/1999 4:28	6.53	2	SC2	Manifold1	Pass	0.0000	-0.0132
92	6017+8023	5/17/1999 3:30	5/22/1999 1:33	6.61	1	SC2	Manifold1	FAIL	0.3105	0.3027
93	11897+11897	1/17/2015 16:07	1/20/2015 9:36	7.09	7	ND1	Manifold1	FAIL	0.1910	0.2172
94	11897+11897	1/21/2015 3:45	1/28/2015 2:49	6.81	3	ND1	Manifold1	FAIL	0.1859	0.1909
95	11897+11897	1/28/2015 9:27	2/2/2015 5:23	6.75	2	ND1	Manifold1	FAIL	0.3265	0.3517
96	11897+11897	2/3/2015 4:56	2/13/2015 8:47	6.13	4	ND1	Manifold1	Pass	0.0964	0.1049
97	12062+5048	5/3/2014 5:49	5/12/2014 5:02	6.80	6	ME1	Manifold1	Pass	0.0967	0.1120

Tank Data

test	tank	site	device	started_time	completed_time	reported	manifold	product	size	vapor	blend	24hr	state	throughput
1	1	GA1	Tank1	1/25/2015 7:04	2/13/2015 7:13	Pass	1	Gasoline	9695	True	True	True	GA	195,161
6	3	IL1	Manifold3	8/13/2014 12:12	8/19/2014 11:58	Pass	2	Gasoline	4219+4219	True	False	False	IL	20,876
8	3	IL1	Manifold3	8/25/2014 3:46	8/30/2014 5:04	Pass	2	Gasoline	4219+4219	True	False	False	IL	20,876
9	3	IL1	Manifold3	8/30/2014 5:04	9/4/2014 5:09	Pass	2	Gasoline	4219+4219	True	False	False	IL	19,081
10	3	IL1	Manifold3	9/4/2014 5:09	9/9/2014 5:32	Pass	2	Gasoline	4219+4219	True	False	False	IL	19,081
11	3	IL1	Manifold3	9/9/2014 5:32	9/14/2014 10:03	Pass	2	Gasoline	4219+4219	True	False	False	IL	19,081
12	3	IL1	Manifold3	9/14/2014 10:03	9/20/2014 12:31	Pass	2	Gasoline	4219+4219	True	False	False	IL	19,081
13	4	TX1	Tank1	1/29/2015 6:39	2/13/2015 6:43	Pass	1	Gasoline	19951	True	True	False	TX	445,408
27	9	MO1	Tank2	1/16/2015 2:15	1/21/2015 3:01	Pass	1	Gasoline	3990	True	True	True	MO	2,955
28	9	MO1	Tank2	1/21/2015 3:01	1/26/2015 4:54	Pass	1	Gasoline	3990	True	True	True	MO	2,955
29	9	MO1	Tank2	1/26/2015 4:54	2/3/2015 12:26	Pass	1	Gasoline	3990	True	True	True	MO	2,955
30	9	MO1	Tank2	2/3/2015 12:26	2/8/2015 12:29	Pass	1	Gasoline	3990	True	True	True	MO	1,315
31	9	MO1	Tank2	2/8/2015 12:29	2/13/2015 3:17	Pass	1	Gasoline	3990	True	True	True	MO	1,315
32	9	MO1	Tank2	2/13/2015 3:17	2/25/2015 12:26	Pass	1	Gasoline	3990	True	True	True	MO	1,315
33	10	MO1	Tank3	7/31/2014 4:35	8/6/2014 8:31	Pass	1	Diesel	16279	False	False	True	MO	75,456
34	10	MO1	Tank3	8/6/2014 8:31	8/12/2014 8:08	Pass	1	Diesel	16279	False	False	True	MO	75,456
35	10	MO1	Tank3	8/12/2014 8:08	8/27/2014 8:47	Pass	1	Diesel	16279	False	False	True	MO	75,456
37	10	MO1	Tank3	9/1/2014 10:05	9/10/2014 1:46	Pass	1	Diesel	16279	False	False	True	MO	94,159
38	10	MO1	Tank3	9/10/2014 1:46	9/16/2014 8:43	Pass	1	Diesel	16279	False	False	True	MO	94,159
39	10	MO1	Tank3	9/16/2014 8:43	9/21/2014 11:02	Pass	1	Diesel	16279	False	False	True	MO	94,159
40	10	MO1	Tank3	9/21/2014 11:02	9/29/2014 7:49	Pass	1	Diesel	16279	False	False	True	MO	94,159
41	10	MO1	Tank3	9/29/2014 7:49	10/4/2014 8:31	Pass	1	Diesel	16279	False	False	True	MO	99,165
42	10	MO1	Tank3	10/4/2014 8:31	10/9/2014 5:51	Pass	1	Diesel	16279	False	False	True	MO	99,165
43	10	MO1	Tank3	10/9/2014 5:51	10/19/2014 10:59	Pass	1	Diesel	16279	False	False	True	MO	99,165
44	10	MO1	Tank3	10/19/2014 10:59	10/26/2014 3:25	Pass	1	Diesel	16279	False	False	True	MO	99,165
45	10	MO1	Tank3	10/26/2014 3:25	11/1/2014 11:01	Pass	1	Diesel	16279	False	False	True	MO	99,165
46	10	MO1	Tank3	11/1/2014 11:01	11/8/2014 4:09	Pass	1	Diesel	16279	False	False	True	MO	110,203
47	11	IN1	Manifold1	7/28/2014 2:19	8/12/2014 2:38	Pass	2	Gasoline	15246+15246	True	True	False	IN	244,158
48	11	IN1	Manifold1	8/12/2014 2:38	8/31/2014 2:48	Pass	2	Gasoline	15246+15246	True	True	False	IN	244,158
49	12	IN1	Manifold1	1/17/2015 3:49	2/13/2015 9:01	Pass	2	Gasoline	15246+15246	True	True	False	IN	250,850
51	14	IN2	Manifold1	12/24/2014 8:20	1/20/2015 11:02	Pass	2	Gasoline	1595+5897	False	True	True	IN	136,634
84	19	SC1	Manifold1	7/5/1999 6:27	7/20/1999 12:38	Pass	2	Diesel	12160+20731	False	False	True	SC	250,457
85	20	SC2	Manifold1	2/8/1999 1:47	2/13/1999 4:47	Pass	2	Gasoline	6017+8023	False	False	True	SC	31,328
86	20	SC2	Manifold1	2/13/1999 4:47	2/18/1999 11:13	Pass	2	Gasoline	6017+8023	False	False	True	SC	28,775
87	20	SC2	Manifold1	2/18/1999 11:13	2/25/1999 4:20	Pass	2	Gasoline	6017+8023	False	False	True	SC	28,775
88	20	SC2	Manifold1	2/25/1999 4:20	3/2/1999 6:05	Pass	2	Gasoline	6017+8023	False	False	True	SC	28,775
89	20	SC2	Manifold1	3/2/1999 6:05	3/8/1999 1:24	Pass	2	Gasoline	6017+8023	False	False	True	SC	28,071
90	21	SC2	Manifold1	5/5/1999 1:43	5/10/1999 8:44	Pass	2	Gasoline	6017+8023	False	False	True	SC	32,801
91	21	SC2	Manifold1	5/10/1999 8:44	5/16/1999 7:43	Pass	2	Gasoline	6017+8023	False	False	True	SC	35,565
92	21	SC2	Manifold1	5/16/1999 7:43	5/22/1999 1:59	Pass	2	Gasoline	6017+8023	False	False	True	SC	35,565
93	22	ND1	Manifold1	1/5/2015 12:48	1/20/2015 2:11	Pass	2	Gasoline	11897+11897	False	True	True	ND	105,762
94	22	ND1	Manifold1	1/20/2015 2:11	1/28/2015 7:25	Pass	2	Gasoline	11897+11897	False	True	True	ND	105,762
95	22	ND1	Manifold1	1/28/2015 7:25	2/2/2015 9:08	Pass	2	Gasoline	11897+11897	False	True	True	ND	105,762
96	22	ND1	Manifold1	2/2/2015 9:08	2/13/2015 10:07	Pass	2	Gasoline	11897+11897	False	True	True	ND	102,690
97	23	ME1	Manifold1	5/2/2014 7:25	5/19/2014 7:50	Pass	2	Gasoline	12062+5048	False	True	False	ME	88,467

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August 25, 2017

NWGLDE,

This letter is regarding the "Franklin SCALD 3 CITLDS Automatic Tank Gauging System For Monthly Monitoring", September 14, 2015. Franklin Fueling has two updated consoles, the Evo 200 and Evo 400, that utilize the SCALD 3 CITLDS software that KWA recently evaluated. The Evo 200 and Evo 400 consoles are identical with the exception of the number of input channels. The Franklin Fueling Systems Evo 400 console was evaluated in August 2017 using the Standard Test Procedures for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems", EPA/530/UST-90/006, March 1990. This evaluation meets the requirements of the U.S. Environmental Protection Agency for Automatic Tank Gauging Systems (ATGS) for Monthly Monitoring.

Ken Wilcox Associates has added an addendum to the September 2015 report, dated August 24, 2015, to include the Evo 200 and Evo 400 consoles. It is of our opinion that the Evo 200 and Evo 400 consoles should be added to the current NWGLDE listing for SCALD 3 CITLDS Automatic Tank Gauging Systems for Monthly Monitoring.

Sincerely,

H. Kendall Wilcox

Craig Wilcox

Ken Wilcox, President
KWA, Inc.

Craig Wilcox, Vice President
KWA, Inc

Issue Date: November 16, 2015
Revision Date: October 17, 2017

Franklin Fueling Systems

INCON T5 Series, TS-5, TS-550, TS-5000, TS-550evo, TS-5000evo, Colibri, EVO 200 and EVO 400 consoles with SCALD 3 (INCON TSP-LL2 and FMP-LL3 Magnetostrictive Probe)

CONTINUOUS IN-TANK LEAK DETECTION METHOD
(Continuous Automatic Tank Gauging)

Certification	Leak rate of 0.2 gph with PD > 95% and PFA < 0.001%.
Leak Threshold	0.17 gph for single tanks at 95% PD. 0.155 gph for manifolded tank systems at 95% PD. 0.16 gph for single tanks at 99% PD. 0.135 gph for manifolded tank systems at 99% PD. A tank system should not be declared tight and a message printed for the operator, if the test results indicate a loss or gain that exceeds this threshold.
Applicability	Gasoline, diesel, aviation fuel, fuel oil #4, biodiesel blends B6-B20 meeting ASTM D7467, biodiesel B100 meeting ASTM D6751.
Tank Capacity	Maximum of 32,891 gallons for single tanks and for all tanks manifolded together.
Throughput	Monthly maximum of 445,408 gallons.
Waiting Time	None. The algorithm tests the data for stability and discards those before the tank is stable.
Test Period	Data collection time ranges from 5 to 26 days. Data sampling frequency is at least once per minute. System collects data at naturally occurring product levels without interfering with normal tank operation, and discards data from unstable periods when system performs test.
Temperature	Average for product is determined by a minimum of 5 thermistors.
Water Sensor	Must be used to detect water ingress. Minimum detectable water level in the tank is 0.208 inch (0.44 inch using model TSP-IGF4P). Minimum detectable change in water level is 0.011 inch (0.013 inch using model TSP-IGF4P).
Calibration	Thermistors and probe must be checked and, if necessary, calibrated in accordance with manufacturer's instructions.
Comments	The user configuring the system can select between 99% and 95% PD modes. System reports a result of "pass" or "fail". Evaluated using both single and manifolded tank systems with probes in each tank. Constant and variable leaks were mathematically induced into tight tank test records which were collected by systems installed at various active tank sites. The database for evaluation of the system includes sites with vapor recovery and blending dispensers. Tanks used in this evaluation contained gasoline and diesel. Tests only the portion of the tank containing product. As product level is lowered, the leak rate in a leaking tank decreases (due to lower head pressure). Consistent testing at low levels could allow a leak to remain undetected. EPA leak detection regulations require testing of the portion of the tank system which routinely contains product. Data from periods when the tank volume is below 14% of maximum are not used for leak detection.

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Evaluator: Ken Wilcox Associates
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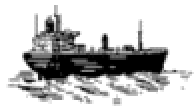
Dates of Evaluations: 09/14/15



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