

Results of U.S. E.P.A. Standard Evaluations

Certification Reports

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Results of U.S. EPA Standard Evaluation Volumetric Tank Tightness Testing Method

This form tells whether the tank tightness testing method 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 U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Volumetric Tank Tightness Testing Methods." 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 provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

Method Description

Name TLS-250/250i/300/300i/300C/300PC/350/350PC/350R/350RPC UST Monitoring Systems

Version number 8463, 8473, or 8493 Digital Sensing Probe (Magnetostrictive)

Vendor Veeder Root

125 Powder Forest Drive
(street address)

P.O. Box 2003

Simsbury
(city)

CT
(state)

06070-2003
(zip)

(860) 651-2700
(phone)

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.71 gallon per hour, has a probability of false alarms [P_{FA}] of 1.0 %.

The corresponding probability of detection [P_D] of a 0.10 gallon per hour leak is 99.0 %.

Therefore, this method (**X**) does () ~~does not~~ meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.10 gallon per hour at P_D of 95% and P_{FA} of 5%).

Test Conditions During Evaluation

The evaluation testing was conducted in a 10,000 gallon (**X**) steel () fiberglass tank that was 96 inches in diameter and 324 inches long.

The temperature difference between product added to fill the tank and product already in the tank ranged from -11.4 °F to +7.1 °F, with a standard deviation of 5.71 °F.

The product used in the evaluation was No. 2, Diesel.

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 method are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 15,000 gallons.
- The tank is at least 95¹ percent full.
- The waiting time after adding any substantial amount of product to the tank is 8.25 hours.
- The temperature of the added product does not differ more than 8.57 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 3 hours.
- Large vapor pockets are identified and removed (for methods that overfill the tank).
- The method (X) can () ~~cannot~~ be used if the groundwater is above the tank. See other limitations below.²
- Other limitations specified by the vendor of determined during testing:

¹The method tests the tank below the liquid level. Associated testing (at MRI) of the system as an ATG demonstrated that the method is valid when the tank is 50-95% full. ²This system operates in conjunction with an ATG system. If the groundwater is above the bottom of the tank, a non-tight tank may be detected by means of continuous monitoring of the water level in the bottom of the tank by the ATG system.

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the volumetric tank tightness testing method was operated according to the vendor's instructions. I also certify that the evaluation was performed according to the standard EPA test procedure for volumetric tank tightness testing methods and that the results presented above are those obtained during the evaluation.

J. D. Flora
(printed name)

J.D. Flora
(signature)

March 14, 1995
(date)

Midwest Research Institute
(organization performing evaluation)

425 Volker Blvd., Kansas City, MO 64110
(city, state, zip)

(816) 753-7600
(phone number)

Results of U.S. EPA Standard Evaluation Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) 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 U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." 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.

ATGS Description

Name TLS Series 200/200i/300/400 Monitoring Systems

Version Magnetostrictive Probe

Vendor Veeder-Root

125 Powder Forest Drive, P. O. Box 2003
(street address)

Simsbury CT 06070-7684 (860) 651-2700
(city) (state) (zip) (phone)

Evaluation Results

This ATGS, which declares a tank to be leaking when the measured leak rate exceeds the threshold of 0.126 gallon per hour, has a probability of false alarms [P(FA)] of 0.4 %.

The corresponding probability of detection [P(D)] of a 0.2 gallon per hour leak is 98.4 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.544 inch. (The manufacturer does not report water below 0.75 inch in operating mode.)

The minimum change in water level that can be detected by the ATGS is 0.027 inch (provided that the water level is above the threshold).

Therefore, this ATGS does does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.2 gallon per hour at P(D) of 95% and P(FA) of 5%), and this ATGS does does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 10,000 gallon steel fiberglass tank that was 96 inches in diameter and 324 inches long.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.2 °F to 7.3 °F, with a standard deviation of 5.0 °F.

The tests were conducted with the tank product levels 50 and 95 % full.

The product used in the evaluation was No. 2, Diesel.

Name of ATGS TLS Series 100/200i/300/400 Monitoring Systems

Version Magnetostrictive Probe

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 ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 15,000 gallons.
- The product level is at least above the minimum specified by manufacturer, which varies with probe length: for example, 24 inches for 6-ft, 30 inches for 8-ft, 36 inches for 10-ft probes.
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than 7.5 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 2 hours.
- Other limitations specified by the vendor or determined during testing:

The system was tested with the tank 50% full and 95% full. There was no significant difference in performance at the two levels, using Section 7.3.5 of the EPA Protocol, so the system can test at any product level above the manufacturer's minimum, which varies with tank diameter. The system tests the tank below the liquid level. The PFA and PD estimates were made based on testing of the system with 2-inch floats (MRI Project 3057). The system as implemented in the U.S. also uses 4-inch floats, which should give at least as good performance. The water detection results were based on tests with 4-inch floats (MRI Project 3078).

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

- standard EPA test procedure for ATGS
- alternative EPA test procedure for ATGS

J. D. Flora
(printed name)

J. D. Flora
(signature)

September 4, 1997
(date)

ATGS - Results Form

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Results of U.S. EPA Evaluation
Automatic Tank Gauging System (ATGS)
Continuous Statistical Leak Detect Method (CSLD)

This form tells whether the automatic tank gauging system (ATGS) described below used in a CSLD mode 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 "Alternative Test Procedure Deemed Equivalent to EPA's." 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.

ATGS Description

Name TLS Series 300/350/Simplicity/PC Monitoring Systems with CSLD

Version Number 8472 Capacitance Probe / 8463, 8473, or 8493 Magnetostrictive Probe

Vendor Veeder-Root

125 Powder Forest Drive, P.O. Box 2003
 (street address)

Simsbury CT 06070-2003 (860) 651-2700
 (city) (state) (zip) (phone)

Evaluation Results

This ATGS, which operates in two modes depending on the specified probability of detection of a leak rate of 0.20 gallon per hour, declares a tank to be leaking when the measured leak rate exceeds a threshold designed for the chosen mode. The threshold, probability of false alarm, P(FA), and probability of detection, P(D), of detecting a leak rate of 0.20 gallon per hour, are given in the table below for the two modes of operation.

Threshold	Probability of False Alarm (FA)	Probability of Detection [P(D)]
0.17	<0.1%	95%
0.16	<0.1%	99%

The minimum water level (threshold) in the tank that the ATGS can detect is 0.75 inch for the magnetostrictive version #8473 probe, 0.63 inch for the versions #8463 and #8493, and 1.52 inches for the capacitance version #8472 probe.

The minimum change in water level that can be detected by the ATGS is 0.027 inch for the magnetostrictive versions #8463, #8473, and #8493 probe and 0.027 inch for the capacitance version #8472 probe.

Based on these results, the method (X) does () ~~does not~~ meet the federal performance standards established by the U.S. Environmental Protection Agency of 0.20 gallon per hour at P(D) of 95% and P(FA) of 5%.

Name of ATGS TLS Series 300/350/Simplicity/PC Monitoring Systems with CSLD

Version 8472 Capacitance Probe / 8463, 8473, or 8493 Magnetostrictive Probe

Test Conditions During Evaluation

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

Tank Size (gallons)	<5000	5,000-9,500	9,600-19,900	>20,000	Total # of Records
Number of Records	0	5	25	16	46

The tanks had various monthly throughputs:

Percentile of Records	25 th	50 (median)	75 th	Maximum
Monthly throughput (gallons)	10,373	35,816	66,059	227,559

The data included _____ 18 _____ records during hot weather months.
_____ 12 _____ records during mild weather months.
_____ 16 _____ records during cold weather months.

The temperature difference between product added to fill the tanks and product already in the tank ranged from -14.5 °F to +15.3 °F, with a standard deviation of 4.8 °F.

The tests were conducted with the tank product levels ranging from 5% to 99% full.

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 ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 45,000 gallons.
- The data records cover _____ * _____ days or more. (See Below)
- Other limitations specified by the vendor or determined during testing:

*The required data length depends on the throughput and is determined by the statistical algorithm. The data length ranged from 7 days to 29 days in the evaluation.

The system tests the tank below the liquid product level. The system checks for temperature stability and only accepts data from periods of acceptable stability.

- > **Safety disclaimer: This test procedure only addresses the issue of the method's ability to detect leaks. It does not test the equipment for safety hazards.**

Name of ATGS TLS Series 300/350/Simplicity/PC Monitoring Systems with CSLD

Version 8472 Capacitance Probe / 8463, 8473, or 8493 Magnetostrictive Probe

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 one of the following:

- () standard EPA test procedure for ATGS
(X) alternative EPA test procedure for ATGS adapted for the continuous statistical leak detection (CSLD) mode of operation of the ATGS by incorporating procedures from the EPA test procedure for SIR as well as tests specific to the CSLD mode of operating an ATGS.

Jairus D. Flora, Jr.
(printed name)

Midwest Research Institute
(organization performing evaluation)

Jairus D. Flora, Jr.
(signature)

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August 31, 1995
(date)

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Results of U.S. EPA Evaluation
Automatic Tank Gauging System (ATGS)
Continuous Statistical Leak Detect Method (CSLD)

This form tells whether the automatic tank gauging system (ATGS) described below used in a CSLD mode 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 "Alternative Test Procedure Deemed Equivalent to EPA's." 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.

ATGS Description

Name TLS Series 300/350/Simplicity/PC Monitoring Systems with Manifolded Tanks
 CSLD
 Version Number 8463, 8473, or 8493 Magnetostrictive Probe
 Vendor Veeder-Root
125 Powder Forest Drive, P.O. Box 2003
 (street address)
Simsbury CT 06070-2003 (860) 651-2700
 (city) (state) (zip) (phone)

Evaluation Results

This ATGS, which operates in two modes depending on the specified probability of detection of a leak rate of 0.20 gallon per hour, declares a tank to be leaking when the measured leak rate exceeds a threshold designed for the chosen mode. The threshold, probability of false alarm, P(FA), and probability of detection, P(D), of detecting a leak rate of 0.20 gallon per hour, are given in the table below for the two modes of operation.

Threshold	Probability of False Alarm (FA)	Probability of Detection [P(D)]
0.16	<0.1%	95%
0.15	<0.1%	99%

The minimum water level (threshold) in the tank that the ATGS can detect is 0.75 inch for the magnetostrictive version #8473 probe, and 0.63 inch for the versions #8463 and #8493 probes.

The minimum change in water level that can be detected by the ATGS is 0.027 inch for the magnetostrictive version #8463, #8473, and #8493 probes.

Based on these results, the method (X) does () ~~does not~~ meet the federal performance standards established by the U.S. Environmental Protection Agency of 0.20 gallon per hour at P(D) of 95% and P(FA) of 5%.

Test Conditions During Evaluation

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

Tank Size (gallons)	5929	10,000	12,068	24,284	29,148	Total # of Records
Percentile of Records	Min	20th	Median(50th)	80th	Max	46

The tanks had various monthly throughputs:

Percentile of Records	20th	50 (median)	80th	Maximum
Monthly throughput (gallons)	8,130	23,410	102,925	226,848

The data included _____ 19 _____ records during hot weather months.
 _____ 15 _____ records during mild weather months.
 _____ 12 _____ records during cold weather months.

The temperature difference between product added to fill the tanks and product already in the tank ranged from -35.7 °F to +35.3 °F, with a standard deviation of 7.7 °F.

The tests were conducted with the tank product levels ranging from 4% to 99% full.

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 ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 37,000 gallons.
- The data records cover _____*_____ days or more. (See Below)
- Other limitations specified by the vendor or determined during testing:

*The required data length depends on the throughput and is determined by the statistical algorithm. The data length ranged from 9 days to 28 days in the evaluation.

The system tests the tank below the liquid product level. The system checks for temperature stability and only accepts data from periods of acceptable stability.

> **Safety disclaimer: This test procedure only addresses the issue of the method's ability to detect leaks. It does not test the equipment for safety hazards.**

Name of ATGS TL5 Series 300/350/Simplicity/PC Monitoring Systems with Manifold Tanks CSLD

Version 8463, 8473, or 8493 Magnetostrictive Probe

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 one of the following:

- standard EPA test procedure for ATGS
 alternative EPA test procedure for ATGS adapted for the continuous statistical leak detection (CSLD) mode of operation of the ATGS by incorporating procedures from the EPA test procedure for SIR as well as tests specific to the CSLD mode of operating an ATGS.

Jairus D. Flora, Jr.
(printed name)

Midwest Research Institute
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Jairus D. Flora, Jr.
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425 Volker Blvd., Kansas City, MO 64110
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September 15, 1993
(date)

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(phone number)

Results of U.S. EPA Standard Evaluation Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) 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 U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." 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 provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

ATGS Description

Name TLS Series 300/350/Simplicity/PC Monitoring Systems

Version number 8463/8473/8493 Magnetostrictive Probe

Vendor Veeder-Root

125 Powder Forest Drive, P.O. Box 2003
(street address)

<u>Simsbury,</u>	<u>CT</u>	<u>06070-7684</u>	<u>(860) 651-2700</u>
(city)	(state)	(zip)	(phone)

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.126 gallon per hour, has a probability of false alarms [P_{FA}] of 1.6 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 99.5 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.66 inch.

The minimum change in water level that can be detected by the ATGS is 0.005 inches (provided that the water level is above the threshold).

Therefore, this ATGS (**X**) does () does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.20 gallon per hour at P_D of 95% and P_{FA} of 5%), and this ATGS (**X**) does () does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,500 gallon () steel (**X**) fiberglass tank that was 120 inches in diameter and 323.25 inches in length.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.0 deg F to +5.7 deg F, with a standard deviation of 4.3 deg F.

The tests were conducted with the tank product levels 50 to 95 % full.

The product used in the evaluation was diesel.

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 ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 20,000 gallons.
- The tank is at least See Note Below¹ percent full.
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than ±6.4 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 2 hours.
- Other limitations specified by the vendor of determined during testing:

None

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

- standard EPA test procedure for ATGS
 alternative EPA test procedure for ATGS

H. Kendall Wilcox, President
(printed name)

H. Kendall Wilcox
(signature)

June 29, 1998
(date)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

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¹ See Attachment 1 - Minimum Product Levels for Leak Detection Tests. The minimum product level for leak detection tests varies with probe length, as specified by the manufacturer.

Attachment 1

**Results of U.S. EPA Standard Evaluation
Automatic Tank Gauging System (ATGS)**

Minimum Product Levels for Leak Detection Tests

Probe Working Length (Tank ID) (inches)	Minimum Level (inches) from Probe Bottom
24 through 26	9
27 through 36	12
38 through 47	15
48 through 58	18
59 through 69	21
70 through 79	24
80 through 90	27
91 through 101	30
102 through 111	33
112 through 122	36
123 through 133	39
134 through 143	42
144 through 154	45
155 through 165	48
166 through 175	51
176 through 177	54

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