

AUTOMATIC TANK GAUGES (ATGs)

An ATG is an electronic device, typically located in the office or back room of an UST facility, whose basic function is to tell you what is going on inside your tank (e.g., fuel level, volume, and temperature; water level and volume; high and low fuel-level warnings). But, as with a computer, you can add other features to your ATG so that it can perform other useful functions, such as monitoring sensors in interstitial spaces in tanks and lines, monitoring pressurized piping, or communicating remotely by way of a modem.

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Common ATG consoles.

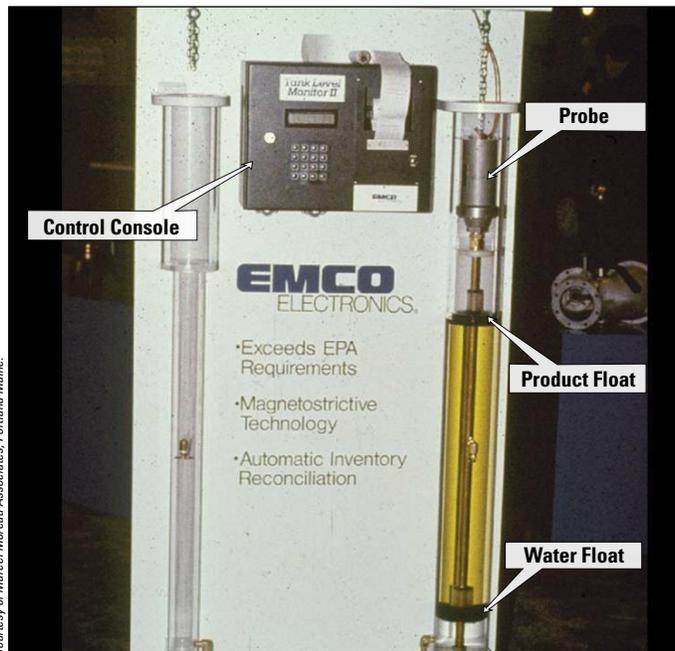


Photos courtesy of Marcel Moreau Associates, Portland Maine.

WHAT ARE THE COMPONENTS OF AN ATG?

An ATG uses probes located in each tank to measure fuel and water levels. Each probe consists of a long rod with two donut-shaped floats that slide along the rod. One float rests on the surface of the fuel, the other on any water that may be present in the bottom of the tank. The position of the floats tells the ATG console how much fuel and water are present in the tank. The probe rod also has thermistors to measure the fuel temperature.

A console is located inside the facility building, and includes a display, a keypad, a printer, status lights, and a beeper that signals alarm conditions.



Courtesy of Marcel Moreau Associates, Portland Maine.

ATG components.

HOW CAN AN ATG BE USED FOR LEAK DETECTION?

ATGs can be used to meet leak detection requirements in several ways:

- **Monitoring the fuel level in the tank.** This method of leak detection uses the basic ATG function of monitoring the fuel level over a period of time, when no fuel is added or removed from the tank, to see if the level is changing. This approach to leak detection is applicable to single-walled tanks only, and only if the ATG system has been registered with the DEP.
- **Monitoring pressurized piping.** This method of leak detection uses a special sensor that monitors the pressure inside the fuel-piping system between customer transactions, when the pressure should be stable. A loss of pressure in the piping may indicate a leak. The pressurized piping sensor (often called an electronic line leak detector) is an add-on device that plugs into the ATG console, just like a printer or scanner can be plugged into a computer. This approach to leak detection is applicable to single-walled pressurized piping only. (Regulatory requirements for monitoring pressurized piping as a method of leak detection are described in the *TankSmart* Piping: Pressurized Pumping Systems module.)
- **Monitoring sensors in interstitial spaces.** This method of leak detection uses liquid sensors that are installed in the interstitial spaces of double-walled tanks and piping. Like the pressurized-piping sensor, the interstitial sensor is an add-on device that plugs into the ATG console. This approach to leak detection is applicable to double-walled tanks and piping only. (Regulatory requirements for interstitial monitoring as a method of leak detection are described in the *TankSmart* double-walled tanks and piping modules.)

What Are the Requirements for Using an ATG as a Monthly Leak Detection Method with Single-Walled Storage Tanks?

To use an ATG for monthly leak detection with single-walled storage tanks, you must meet the following requirements:

- The ATG system must be installed as a permanent component of the facility.
- The ATG must print or record passing test results at least once every 30 days.
- The ATG must have a back-up system to preserve test data during a power outage.
- The ATG must be programmed so that tests are performed according to the manufacturer's instructions.
- The ATG system must monitor for water-level gains of more than 1/2 inch over an 8- to 12-hour period.
- The associated fuel piping must be one of the following:
 - a self-monitoring suction system
 - double-walled with interstitial monitoring
 - equipped with an electronic line leak detector.
- The DEP must receive and approve an ATG registration application.

In order for ATGs to be used for leak detection in single-walled tanks, this registration form must be received and approved by the DEP. To obtain this ATG registration form, visit www.maine.gov/dep/rwm/ust/index.htm or call 207-287-2651.

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Maine Department of Environmental Protection
Requirements for using an Automatic Tank Gauge and Registration Form

If you wish to install and use an Automatic Tank Gauge (ATG) capable of detecting a 0.2 gallon per hour leak in order to meet MeDEP leak detection requirements for single-walled underground oil storage tanks, then the following requirements must be met. Tanks which meet these requirements are exempt from keeping daily product inventory and doing an annual statistical inventory analysis.

- The ATG system must be installed as a permanent component of the facility.
- The ATG must print or record passing test results at least once every 30 days.
- ATG systems must be operated with a back-up system to preserve test data in the event of a power outage.
- The ATG must be programmed so that tests are performed in accordance with manufacturer's instructions.
- ATG system must monitor the tank bottom for water level gains of more than 1/2 inch.
- The associated product piping must be either a self-monitoring suction system, have secondary containment, or be equipped with an electronic line leak detector capable of detecting a 0.2 gallon per hour leak.

The monthly test record must include the following information:
 Test date
 Tank Number & Chamber from the Facility Registration
 The test's leak detection threshold
 Test length
 Test results (Pass or Fail)

Please complete and submit the following form to the MeDEP as a change to your registration. After review, the Department will send you an updated registration certificate.

Facility Information			
Facility Name: _____	Reg. Number: _____		
Mailing Address: _____			
Address	Town	State	Zip Code
Tank #:	Tank Size:	Product Stored:	
Tank #:	Tank Size:	Product Stored:	
Tank #:	Tank Size:	Product Stored:	
ATG Manufacturer: _____		Model: _____	
Installer Name: _____		Installer #: _____	

Please attach a copy of the set up report and a tank test report (including in-line leak test results if applicable) from the ATG.

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How Does an ATG Monthly Tank Test Work?

When using an ATG as your monthly tank-testing leak-detection method, your tank must PASS a test that can detect a 0.2 gallon-per-hour (gph) leak at least once every 30 days. A 0.2 gph leak rate is equivalent to about two cans of soda every hour. Detecting two cans of soda leaking onto your living room rug is pretty easy, but detecting two cans of soda leaking out of an 8,000- or 10,000-gallon tank by measuring the change in fuel volume requires very accurate measurements of fuel level and temperature.

Petroleum, especially gasoline, expands and contracts substantially with temperature, so you must monitor the fuel temperature very closely to get an accurate test. The temperature of fuel being delivered is most often different from the temperature of the fuel in the underground tank. Therefore, after a delivery, the fuel temperature inside a tank changes fairly rapidly, and you will not get good test results with a tank gauge for 6 to 12 hours after the delivery.

There are two types of ATG tank tests: periodic and continuous.

Periodic Test. The tank must be shut down for several hours, during which there should be no dispensing or delivery of fuel. Most periodic tests are done overnight. If the volume change is too great, the test fails. If product is dispensed in the middle of the test, the test usually fails. The periodic test approach is not applicable if your facility is open 24 hours a day.

Continuous Test. The ATG monitors the fuel level for periods of at least 15 to 20 minutes between customers, when a tank is idle. The ATG gathers and stores product-level data in its memory during these quiet intervals. If fuel dispensing starts, the data gathering is interrupted. The ATG then waits for another quiet period to gather more data. It keeps doing this until there is sufficient data to conclude that the tank is either tight or leaking.

WHAT IS THE BIGGEST PROBLEM WITH USING ATGs FOR LEAK DETECTION?

The single biggest problem associated with using ATGs for monthly release detection is:

OPERATORS IGNORING ALARMS!

Alarms are annoying for a reason—the ATG is trying to get your attention! Not all alarms are due to leaks, but ignoring any alarm defeats the purpose of having an ATG. Large leaks have gone undetected when operators either ignored an alarm or turned their ATG off to get rid of the annoying “beeping” sound. Respond immediately to any audible alarm or blinking red or yellow lights!

The single biggest problem associated with using ATGs for monthly release detection is: Operators ignoring alarms!

ATG Tank Test Procedure

How to read an ATG test report.

The ATG test report typically provides you with basic information about product volume and temperature in the tank at the beginning and end of the test. It also prints out the results of the test, usually “pass” or “fail.” You may occasionally get an “inconclusive” result if conditions are not right for conducting a test over the testing period.

If the result is “pass,” file the printout with your leak detection records and retain it onsite for 3 years.

If the result is “fail,” you have evidence of a possible leak. You must **report this to the DEP within 24 hours** and investigate to figure out what happened.

If the result is “inconclusive,” or you have a similar message indicating that a test was not successfully completed, you need to run another test. If you continue to get inconclusive test results, call your service technician to investigate and correct the problem.

What Are the Test Limitations for ATGs?

Be aware of the following ATG tank-test limitations:

- There must be a minimum amount of fuel in the tank for the ATG to get accurate data.
- The periodic type of ATG test is not valid for manifolded tanks. Tanks are manifolded if you have more than one tank with the same fuel in it, and the two tanks are connected so that the fuel levels in the tanks are about equal all the time. ATGs that perform periodic tests are NOT able to conduct valid tests on manifolded tanks unless a special valve is installed that separates the tanks for the duration of the test. ATGs that perform continuous tests ARE capable of testing this type of tank system.
- There is a limit to how large a tank or a set of manifolded tanks an ATG can test.
- For continuous tests, there is a limit on how much fuel you can pump over a period of a month and still have enough quiet time to perform a test.
- All ATGs must wait for a period of time after a delivery before conducting a leak test.

Be aware of
ATG tank-test
limitations.

How Do You Determine the Test Limitations for Your ATG?

To determine the test limitations for your ATG, you need the manufacturer’s certification of performance, also known as the third-party evaluation. These documents are available from the ATG manufacturer, but are also available on the Web at www.nwglde.org or by calling the DEP at 207-287-2651 or your service technician for assistance. Keep the certification of performance for your particular ATG on hand so you know the limitations of your tank gauge.

OTHER USEFUL ATG FUNCTIONS

Besides release detection, other key information that an ATG can provide includes:

- **Ullage Volume Versus 90% Ullage.** Ullage is the amount of empty space left in the tank. For example, if you have an 8,000-gallon tank with 5,000 gallons of fuel in it, then the ullage volume is 3,000 gallons. Ninety percent ullage is the ullage minus 10% of the tank capacity. The 90% ullage volume is the amount of fuel that should fit in the tank without triggering the overfill-prevention device. The 90% ullage number can be used to determine the amount of fuel to order.
- **Gross Versus Net Volume.** Gasoline changes volume quite dramatically with temperature. For example, if you have 10,000 gallons of gasoline and it changes temperature by 1°F, the volume will change by 7 gallons. The gross volume is the actual volume of fuel at whatever temperature it happens to be. The net volume is the amount of fuel that WOULD be in the tank IF the temperature of the fuel were 60°F. The gross volume is the number to use for inventory control purposes.
- **Delivery Reports.** When a delivery occurs, the ATG automatically notes when the fuel level in a tank starts to rise and when it stops rising. The ATG then calculates the difference in volume and prints a report that gives you the volume of fuel delivered. The ATG delivery volume may not match the delivery invoice because any fuel dispensed while the delivery was in progress will not be included in the ATG delivery report.
- **Water Levels.** With traditional gasoline, the ATG reports the amount of water (in both inches and gallons) present in the bottom of the tank. An increase in water level of more than ½ inch over an 8- to 12-hour period must be reported to the DEP Tanks Unit immediately. (Call 207-287-2651.) However, water-level measurements from the ATG may not be accurate in ethanol fuels (even E10). Use a gauge stick and water-finding paste formulated for alcohol fuels to monitor for the presence of water when you are storing any blend of ethanol and gasoline.

If you have an ATG at your facility, it is essential that you know what it does or does not do for you, what it is telling you, and what to do when an alarm—any alarm—sounds.

GET TO KNOW YOUR ATG

If you have an ATG at your facility, it is essential that you know what it does or does not do for you, what it is telling you, and what to do when an alarm—**any alarm**—sounds. There are many brands and models of ATGs; all have the ability to perform essentially the same functions. Insist that your ATG installer, inspector, or maintenance technician trains you and provides clear instructions on the proper operation and maintenance of the ATG. Contact the equipment manufacturer, your UST inspector, or your UST installer if you have questions about operating your ATG.