

# ***#LZ400 – LEAKALYZER***

Water Loss Sensor

## **INSTRUCTION MANUAL**



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*Your Partner in Swimming Pool Water Conservation*

## Product Purpose:

The Leakalyzer measures water level changes to the 10,000th of an inch. This sensitivity enables rapid identification of water loss that would otherwise only be noticeable over much longer observation periods.

## Features:

- Easy to use controls
- LCD readout
- Graph screen that records water loss over time of test
- Detail screen that shows calculated inches and gallons of loss per day or hour
- Adjustable software filter “smoothes” recorded data
- Enter estimate of evaporation for comparison
- Save up to 10 tests for display on handheld unit or for download to your computer for further analysis and report creation using the Leakalyzer Reporter Program.

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# Components:

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**Handheld Analyzer**



Hook



**Base**

Slide Rod

Drain/Fill Valve



Slide Clamp

**Sensor Capsule**

## Operation:

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### Set-up of Sensor Capsule:

1. Place the **Base Plate** at edge of pool or skimmer with hook extending over the water.
2. Assure that the Drain/fill valve on the bottom of the Sensor Capsule is open.
3. Hold the **Sensor Capsule** by knob with one hand, with the other hand position the **slide clamp** into **hook** on the **Base Plate**. Slide capsule down so that water level is within blue tape range, then tighten clamp.
4. Reposition **Base Plate** and **Sensor Capsule** so that **slide rod** is as close to vertical as possible and so that the side of the **Capsule** contacts the pool wall.

Optional step for wavy conditions:

1. After the capsule has had a chance to fill, the Drain/Fill Valve can be closed to limit water movement in and out of the sensor, This feature can help to “smooth” the line on the graph. (when this valve is completely screwed in it will still allow a limited flow of water).

### **NOTE:**

**If possible choose or create a location for the sensor that will remain in the shade for the duration of the test.** Changes to the temperature of the Sensor Capsule and the Base Plate during the test can effect results. This can especially be a problem on partly cloudy days when the sensor is going in and out of the sun.

## Handheld Analyzer Set Up:

1. Connect cable from Handheld Analyzer to the cable at the top of the Sensor Capsule.
2. Push **ON**.
3. **Press any key** to get to Main Menu
4. Use **▲** or **▼** to select “Set Up Test,” press **ENTER** to get to SETUP MENU.
5. Use **▲** or **▼** to select “Surface Area”, “Evaporation Estimate”, or “Filter Strength” then press **ENTER** to see value options.
6. Use **▲** or **▼** to choose appropriate value, press **ENTER** to set value.

**Surface area** values are in square feet\*. This number will be used to calculate gallons of water lost .

**Evaporation values** are in inches\* per 24 hours. This number will be used as a reference line on the graph screen. See **page 10** for more information on finding the Evaporation Estimate.

**Filter Strength:** A higher value will reduce “jags” in the plotted line but will also slow response time. Use a stronger filter for windy days, a weaker filter on calm days or when more responsiveness is desired.

7. Return to the main menu by selecting “Main Menu” and pressing ENTER.
8. Confirm that Sensor is properly positioned as indicated by a “READY” indicator in the top left corner of the screen.
  - “LOW” indicates that sensor should be raised, “HIGH” indicates that sensor should be lowered.
9. From the Main Menu select “Start Test” and press **ENTER**.

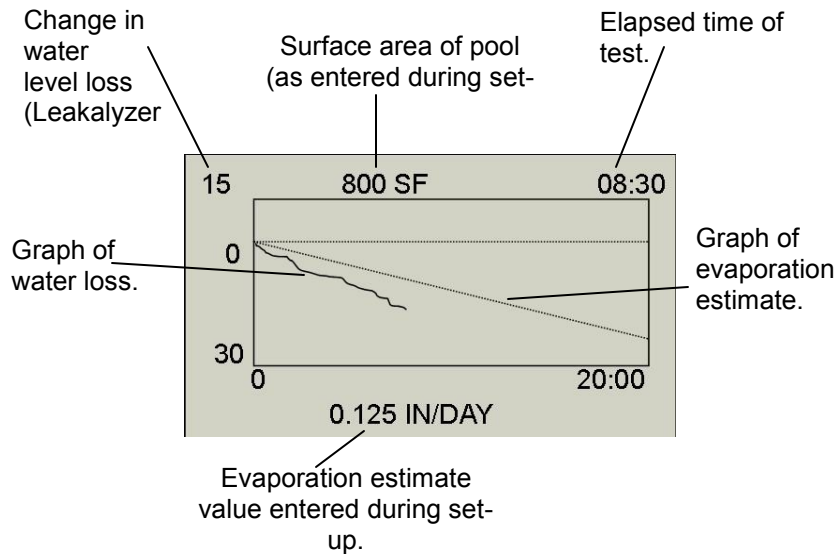
\* Square meters, centimeters and liters for metric version.

## Initialization Period:

Depending on the Filter Strength selected, The Leakalyzer will spend several seconds, (longer for a stronger filter) establishing a stable “zero” value. During this time the screen will indicate that the unit is “Initializing . . .” and provide a countdown of the seconds left for this process.

## Graph Screen– During Test:

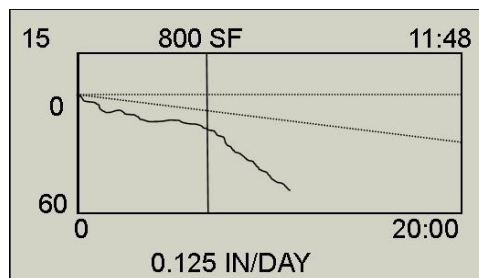
Once Initialization is complete the screen will automatically change to the Graph Display and begin plotting the water loss in the pool.



Vertical scale of graph automatically adjusts based on measured water loss. To adjust this scale manually, press ▲ or ▼. There are four graph scales that range from 40 units (-10 to 30) to 320

## “Marking” the Graph:

You can “Mark” the graph while it is running to identify a certain event. For example, you may want to mark when the pump was turned off in order to compare the rate of water loss to that when it was running. To mark the graph: press both the ▲ and the ▼ at the same time. A vertical line will appear on the graph. Additional analysis capabilities are available on the Leakalyzer Reporter computer program for these marked sections.



Same test as above after a mark was made at 8:30 minutes. Note change in slope since mark and change in scale of graph from

## Details Screen:

The Details Screen shows the data gathered from the test in a numerical form. During the test you can change to Detail Display (and back to Graph Display) by pressing **DETAIL**.

|                                                        |       |        |        |                                                        |
|--------------------------------------------------------|-------|--------|--------|--------------------------------------------------------|
| Calculations of water loss rate in inches and gallons. | 15    | 800 SF | 04:15  | Data from current test                                 |
|                                                        | TOTAL | IN/HR  | GAL/HR | Calculated rate of total water loss.                   |
|                                                        |       | 0.020  | 9.92   |                                                        |
|                                                        | EVAP  | 0.010  | 5.19   | Calculated rate of water loss due to est. evaporation. |
|                                                        | LEAK  | 0.010  | 4.73   | Calculated rate of water loss due to a leak.           |

Detail display shows calculated water loss in inches or gallons. Press ▲ arrow to view this information as per day and the ▼ arrow to view information per hour.

### NOTE: DETAIL SCREEN IS AN ESTIMATE ONLY

Keep in mind that the inches and gallons of water loss that are displayed on the "Detail Screen" are calculations from input data and the average rate of water loss determined from the start of the test to the end of the test. The numbers calculated are only as good as the data that contributes to them. Use the detail screen numbers as a guide as you consider what is 'actually' happening. These detail numbers will be more accurate the longer the test is run under stable conditions.

## Stopping Test:

Test will automatically stop after 2 hours, but may also be stopped before it has reached it's full duration by pressing the **ENTER** key.

**DETAIL** and **▲** or **▼** buttons can still be used to access analysis of information of this finished test.

Once a test is stopped you will be given an option to Return to Test (without stopping), Re-Start Test, Quit & Save, or Quit & Discard. Use **▲** or **▼** to select and **ENTER** to choose desired action.

## Re-Starting Test:

If you want to restart the current test without changing the variables choose the "Re-Start" option from this list shown after a test is stopped. The time and current water level value will re-set to 0 without requiring the "initialization" period.

## Saving Test:

It is possible to save up to ten tests on the Leakalyzer at any one time. This feature allows you to do several tests at the same pool and refer back to earlier tests.

To save a test select "Quit & Save" after stopping the test. Use **▲** or **▼** to select which slot to save the test into and press **ENTER** to save. Slots without previously saved data are indicated as "(empty)." Saving into non-empty slots will overwrite any previously saved test at this slot. Saved tests are stored in memory even when unit is turned off.

Saved tests will automatically be time and date stamped.

All memory can be cleared by Selecting "Clear Memory" from the MAIN MENU



## Viewing Saved Tests on Handheld Unit:

From the Main Menu choose “Review Saved Tests.” Use ▲ or ▼ then **ENTER** to select which saved test to view.

Use **DETAIL** and ▲ or ▼ keys to toggle between desired information in Graph and Detail views as you would during test.

Press **ENTER** to leave.

Saved test use the currently entered Surface Area and Evaporation Estimate values for display. This may be different from what was displayed when the test was run. This feature allows water loss calculations to be figured under various scenarios. If you want to see a different Evaporation Estimate line or change Surface Area information go to the Test Set Up menu and re-enter the information as described in SETUP, then return to the desired saved test.

## Viewing Data on your computer with the Leakalyzer Reporter Program:

Saved data can be downloaded, stored and viewed on your computer.

Download the Leakalyzer Reporter Program from the bottom of the registered user’s page of our website: [www.leaktools.com](http://www.leaktools.com) (you will have to use or assign yourself a username and password to get to the registered users page).

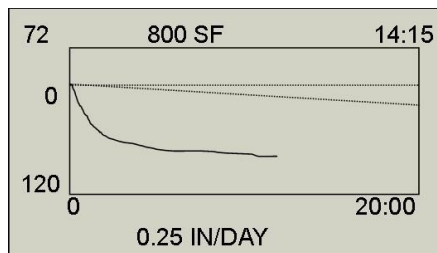
Follow the instruction to get the program loaded on your computer then click on “manual” in the “help” menu for operation instructions.

## Tips and Suggestions:

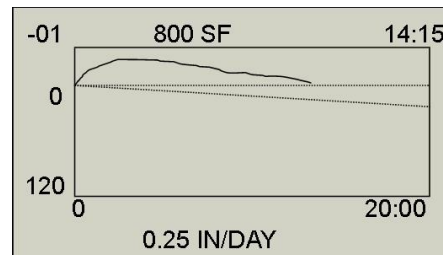
### Temperature Variation:

As the base unit and sensor change temperature there is some expansion and contraction of materials that may affect the results of your test. Most of this change will happen when the unit is first set up at a test location. We recommend that if possible you set the sensor up first and wait 10 minutes before depending on test results.

Tests that are affected by temperature change will normally be indicated by a curved line. Good tests that are measuring consistent water loss (due to a leak) will display a straight line with a constant slope.



This graph is from a test where the sensor was cooling for the first 2-3 minutes. The straight line slope at the end of the test is accurate but “Detail” information on this test will be overstated.



This graph is from a test where the sensor was warming for the first 2-3 minutes. The straight line slope at the end of the test is accurate but “Detail” information on this test will be understated.

If your test shows a curve consider that the straight line slope is actually indicative of water loss. Keep in mind that any test showing a curve will not display accurate readings in the “Detail” section . If a curve is shown on the graph we suggest that you ‘Re-Start” the current test to enable more accurate “Detail” calculations.

## Evaporation:

### **Evaporation is not constant.**

The Leakalyzer is so sensitive that it will measure changes in water level due to evaporation. Although evaporation is often discussed in terms of a rate per 24 hour period, the evaporation rate at any point in time may be very different from this 24 hour average. Evaporation is dependent on a variety of environmental conditions that change at different rates:

| Variable       | Period of Change            | What Increases Evaporation | Significance                             |
|----------------|-----------------------------|----------------------------|------------------------------------------|
| Air Temp       | Within day                  | Lower temp.                | Moderate                                 |
| Water Temp     | Multiple days               | Higher temp.               | Moderate                                 |
| Humidity       | Within day                  | Low humidity               | Low                                      |
| Water Movement | Dependent on pump operation | More movement              | Very Low (unless water fall or fountain) |
| Wind           | Within minutes              | More wind                  | High                                     |

As you use the Leakalyzer you will become more aware of these conditions and be able to sense and predict what evaporation “should” be under certain conditions. We would also suggest that you begin regularly checking the “Evaporation Calculator” which is available at the registered user’s section of [www.leaktools.com](http://www.leaktools.com). This tool will provide a good indication of evaporation rate to be expected based upon the seasonal and daily weather conditions.

**You can also do a test with the Leakalyzer sensor in a bucket of water placed in the pool to establish an evaporation rate that can then be entered into the Leakalyzer at the start of the pool test.**

Keep in mind that the Detail Screen provides estimated calculations of hourly and daily water loss based on the average rate of water loss during the test. In other words, the daily water loss calculation shows what the water loss would be if the current rate was experienced for 24 hours. Since evaporation rates are usually lower at night (when there is less wind), the actual water loss over a 24 hour period may be much less than what is displayed on the screen.

## Wind Gusts:

While wind will effect evaporation, gusting winds will also affect your test by momentarily changing the air pressure pushing down on the pool water. On gusty days it is strongly suggested that a full 20 minute test be used. This will allow the Leakalyzer to “level off” the effect of these gusts and provide a more constant graph.

### **For best results, test with the pool cover on.**

**By testing with the cover on the pool, water loss due to evaporation can be eliminated. Use the safety cover, solar cover, or consider using a thin plastic painters drop cloth which can be floated on the pool surface.**

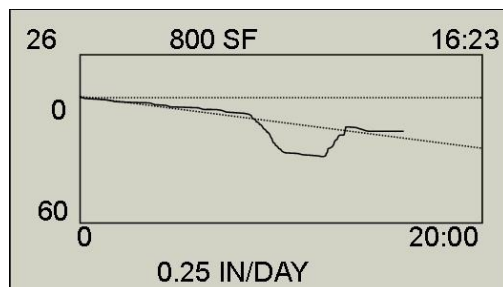
## Understanding “Filtering” and making the graph smooth:

The function of the Leakalyzer is to take actual data (water surface measurements at different times) and present it in a form that allows the user to make decisions about long term trends. Specifically, we need to get a sense of what the constant slope of the line plotting water level changes over time is.

You may find different levels of filtering are beneficial for different purposes. For instance when you want to see the effect of taking a bucket of water out of the pool less filtering will enable a quicker indication of the water level change. When preparing a graph to show to a customer, higher filtering may be beneficial to more simply communicate water loss.

## Checking Sensitivity:

To check or demonstrate sensitivity pull a gallon of water out of the pool and then pour it back in while doing a test. This will help you visualize the actual water loss being recorded.



This graph shows the effect of pulling one gallon of water Out of a 16' x 36' pool and then pouring it back in.

## Leakalyzer Care:

- When dis-assembling Leakalyzer after a test. Open the drain/fill valve to more quickly drain all water from the sensor capsule. Make sure to keep the capsule upright (knob up) until all water has been drained.
- Holding the capsule by the black knob and swinging it gently will expel any remaining water and will help to completely dry the inside of the capsule.
- Make sure Handheld Analyzer is kept in its own case.

**Replace Batteries after 8-10 hours of continuous operation. Low batteries may cause the unit to indicate more water loss than actual.**

## Calibration of LZ400:

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**Note: Only necessary for replacement capsules.**

1. Place the flat white Base on a sturdy table so that the hook overhangs the edge of the table.
2. Attach the Sensor to the Base upside down so that the black knob is pointing toward the floor and the nozzle sticking out of the capsule is pointing straight up.
3. Attach and turn on the Handheld unit.
4. Press both of the arrow keys at the same time. This should get you to a screen titled SENSOR CALIBRATION.
5. Position the \* using the arrow keys to indicate that you Accept the Unloaded Sensor.
6. Stick the stem of the calibration weight into the nozzle of the Sensor. The weight should contact a float inside the capsule so that the washer portion of the weight is held about 1/2" above the nozzle.
7. Spin and wiggle the weight to assure that it is not held up in the nozzle but is resting completely in the float inside the capsule.
8. Position the \* using the arrow keys to indicate that you Accept the Loaded Sensor.

With the weight still in the capsule the upper left corner of the screen should now indicate "LOW".

When the weight is removed the upper left corner of the screen should indicate "READY".

If the indicator does not change when weight is removed or if it says "HIGH" repeat steps 4-8. If you continue having problems please contact Lance at 800-348-1316.

TO COMPLETE THE SUCCESSFUL CALIBRATION THE UNIT MUST BE TURNED OFF BEFORE BEING TURNED BACK ON THE ACTUAL USE AT A POOL.

## **We want your feedback!**

We expect that because the Leakalyzer is the first product of its kind, many more applications and tips will be found by people using the device. Please contact us with your suggestions.

Also, please share your experience and tips with other users on our message board at the registered users section of [www.leaktools.com](http://www.leaktools.com)!

## **Questions?**

Call Lance at 800-348-1316 or 651-484-1316 or email  
[landerson@leaktools.com](mailto:landerson@leaktools.com)



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