ANDalyze

Document: AND-Prod-1000-10-2012

AND1000 Fluorimeter for Water Testing

User Manual

October, 2012 Edition 2

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2 Safety Information

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger, warning and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment. Make sure that the protection provided by this equipment is not impaired, do not use or install this equipment in any manner other than that specified in this manual. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the manufacturer may be impaired.

2.1 Use of Hazard Information

DANGER:

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION:

Indicates a potentially hazardous situation that may result in minor or moderate injury.

Important:

Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

Note:

Information that supplements points in the main text.

2.2 Precautionary Labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol, if noted on the instrument, will be included with a danger or caution statement in the manual. This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information. Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August of 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the manufacturer for disposal at no charge to the user.

Note: For return for recycling, please contact the equipment producer or supplier for instructions on how to return end-of-life equipment, producer-supplied electrical accessories and all auxiliary items for proper disposal.

2.3 Chemical and Biological Safety

DANGER: Potential Chemical/ Biological Exposure Hazards. Handling chemical samples, standards and reagents can be dangerous. Users of this product are advised to familiarize themselves with safety procedures and the correct use of chemicals, and to carefully read all relevant Material Safety Data Sheets.

- Normal operation of this instrument may involve the use of hazardous chemicals or biologically harmful samples.

- The user must observe all cautionary information printed on the original solution containers and safety data sheet prior to their use.

- All waste solutions must be disposed in accordance with local and national law.

- The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

3 General Information

3.1 Overview of Product

The AND1000™ Fluorimeter enables field testing to be done in two short steps, eliminating or significantly reducing test expenditures, complexity and wait times experienced in traditional heavy metals water testing. The Fluorimeter uses an extremely sensitive measurement technique to determine the levels of heavy metal contaminants. ANDalyze's proprietary Catalytic DNA sensors use a DNAzyme reaction that fluoresces in the presence of a target contaminant substance such as lead. The fluorescence of the reaction is measured to determine the concentration of the target heavy metal and is reported in parts per billion (ppb). Using the product to test for metals is a simple, quantitative test that allows for detection at or below US EPA standards in drinking water. The test is performed by taking a 1 milliliter water sample, injecting it through the sensor, and into the AND1000 fluorimeter. This sample is then automatically analyzed and reports results in less than two minutes.

3.2 General Features

- Fluorescence Based Sensing - Reaction produces quantitative fluorescence based results.
- Sensor Kit - Each disposable color-coded sensor is designed for a specific heavy metal test target. Kits provide sampling tubes, syringes and cuvettes.
- Rugged & Convenient Construction - Tough, light weight, impact-resistant shell protects electronics and sensors.
- Key Pad - Quick, simple menu navigation and one button push for sample analysis.
- Data Capture & Reporting - Time and date stamped with sample number. Stores over 240,000 test results and over 75 site locations. Data downloadable through a USB cable.
- Water Resistant - Enclosure rating - IP54
- Portable - Battery operated and rechargeable through USB cable or traditional adapter.

Note: See full technical specifications in section 9.

3.3 Analyte Sensors

To help differentiate the materials specific to each analyte, the packaging has been individually labeled and the sensor housings and buffer caps have been color coded. For Example:

Green – Lead (Pb) Orange – Uranium (U) Blue – Copper (Cu) Gray – Mercury (Hg) Etc.

Note: In some cases the same sensor is used for multiple ranges but different buffers and/or methods will accompany the sensor in the kit.

3.4 Operating Environment and Storage

Important: The following conditions are necessary to ensure correct instrument operation and accurate results:

- Place the instrument firmly on a flat and even surface during operation.
- Maintain an ambient temperature of 10 to 40 ºC (50 to 104ºF) for proper fluorimeter operation. Please see the manual for each specific metal for sensor specific temperature conditions.
- The relative humidity should be less than 80%; moisture should not condense on the instrument.
- Do not operate or store the instrument in extremely dusty, damp or wet locations.
- Keep the surface of the instrument, the cell compartment and all accessories clean and dry.
- Sensors are stable up to 1 year if stored at <23˚C (74˚F), <50 % R.H. away from direct sunlight. For best results, store in the refrigerator (4˚C/39˚F).
- Buffer solutions are stable up to 6 months if stored at <23 ˚C (74˚F) but if stored in the refrigerator (4˚C/39˚F), can be used for up to 1 year.
- Sensors and buffers must be brought to room temperature before use.

3.5 Water Testing Guidelines

Note: This is a drinking water test kit. If you are testing other matrices such as surface water, ground water or industrial water; contact ANDalyze customer service for additional application notes.

Water Sampling

- For best results use freshly collected sample (unpreserved) for analysis. We recommend that you use the sample within 1 hour (maximum of 2 hours) of collection to minimize any metal loss to the walls of the sample container. This is particularly important for testing trace lead levels.
- Once the sample is mixed with ANDalyze sample buffer, test within 15 minutes.

pH Range

- Tests have shown that environmental samples preserved in acid to a pH < 2 cannot usually be brought to an appropriate pH when mixed with the ANDalyze buffer. These samples must be first neutralized with NaOH to a suitable pH before mixing with ANDalyze buffer. Please contact ANDalyze customer service for instructions related to pre-treatment of highly acidic or highly basic samples.

4 Set-Up and Operating Procedures

4.1 Charging the Battery

Important: Before using the instrument assure that the fluorimeter device is charged.

To Confirm the Battery Level:

1. Turn Power ON by pressing and Holding the ON/OFF button. (See Horizontal Arrow on Photo to Right)

2. Once device is initiated, confirm the battery indicator status is green (See Vertical Arrow on Photo to Right). The battery indicator should not be red (as seen in the photo to right)

Charging the Battery:

1. Release the Rubber Boot at the bottom of the meter.

2. Attach the USB to MINI-B Cable to the outlet at the bottom of the device and to a USB powered source such as a computer or a USB charger. (See Photo to Right).

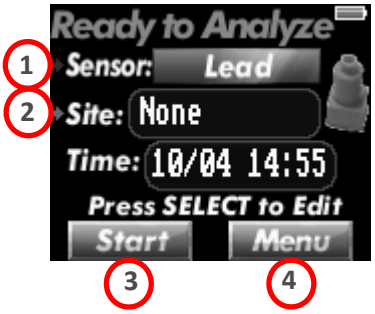
4.2 Home Testing Screen

Options can be accessed by:

- Using the **up/down** buttons and pressing **SELECT** button when the arrow is to the left of the desired option.
- OR by pressing the button located just below the screen under the desired options at bottom.

Selectable Options:

1) **Sensor -** Selects which Sensor will be tested.
2) **Site -** Uses site specific calibrations for accurate tests.
3) **Start -** To begin a test of the indicated metal.
4) **Menu** - To change or view internal settings.



4.3 Sensor Screen

Selecting the Sensor option allows the user to change the sensor which the meter will detect.

Once selected, the Color of the area surrounding the name of the sensor and the photo of the sensor at the right on the Home Screen will match the color of the sensor itself used for testing.

4.4 Site Screen

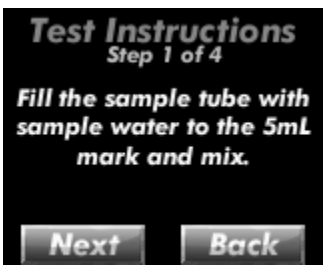
Selecting the Site option allows the user to change or create new sites.

Sites are important because each water sample contains differences which affect testing results. It is recommended that each location is calibrated. So by selecting a site, this calibration can be used repeatedly.

Please see section 5 below for further instructions on setting up and calibrating sites.

4.5 Start Option

Depending on your Options settings, pressing the Start button will either start the testing instructions OR, if turned OFF, will begin the testing immediately (for advanced users).



4.6 Menu Screen

The Menu Screen can be accessed by pressing the button located below the screen under **Menu.**

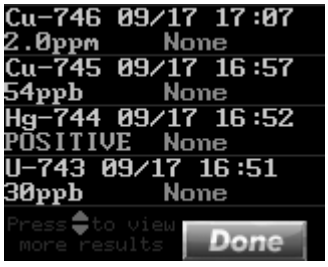
Selectable Options:

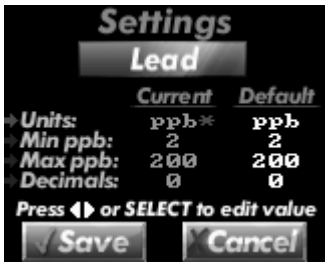
1. **Results**
2. **Settings**
3. **Options**
4. **Advanced**
5. **About**
6. **Date/Time**
7. **Help**

Options are selectable using the arrow keys and pressing **Select** button or by pressing the button located below the screen under the **Select.**

Results

- Displays the results of the previous four tests.
- Scroll up or down to view additional results





Settings

- **Units**: Determines units for displaying metal concentration. You can change this to ppb, ppm, µM or nM.
- **Min ppb**: At concentrations less then min ppb, "Below Limit" is displayed.
- **Max ppb**: At concentrations greater than max ppb, "Above Max" is displayed.
- **Decimals:** Changes the number of decimals displayed in the results. Under some circumstances the decimals will be defaulted.

Note: The Default values are the settings recommended by the manufacturer.

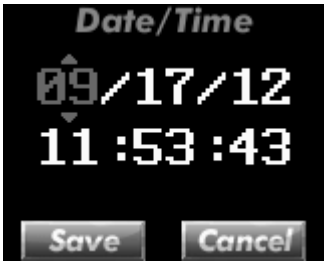
About

- Displays the Hardware and Firmware versions of the meter including the most recent date the firmware was updated.

Note: Update firmware if it has not been done recently.

Date and Time

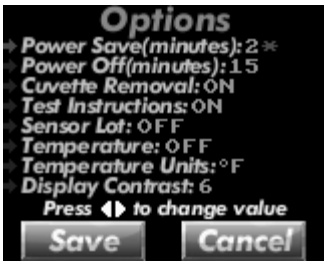
- Set the date and time to maintain accurate history. Edit using the arrow keys and **Save**



Help

- Displays How-To video showing a sample calibration or provides link to view videos online.

Options

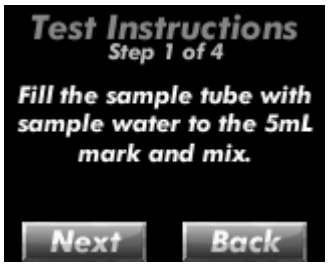


Power Save: This sets the minutes when the display will turn black to save power. Settable from 1 to 5 minutes.

Power Off: This is the minutes which the unit will turn itself off after it goes into power save mode. Settable from 6 to 15 minutes.

Cuvette Removal: Turning this ON will cause a screen to appear after each test reminding the user to remove the cuvette from the sample chamber.

Test Instructions: In the ON position, 4-step instructions will display in order when Test is selected from the home screen. After the 4th step, the test will begin. In the OFF position, the testing begins immediately.



Sensor Lot: Turning this option ON allows the user to enter the lot number of the sensors at the time of a site calibration. This helps to identify when a new site calibration is required (new lot batch).

Temperature: Turning this option ON allows the user to enter the temperature of the sample water at the time of a site calibration. This helps to identify when a new site calibration is required (significant change in water temperature).

Temperature Units: Switch between Celsius and Fahrenheit for temperature entry and displays.

Display Contrast: Adjusts the brightness of the display. Higher value indicates a brighter display.

Advanced

User can View and Set parameters for each specific sensor. Edit values using up/down keys and SELECT.

Window: Determines the number of points that will be used to calculate the rate of fluorescence increase over time. We use a moving average method to calculate maximum rate. (If the value of window and samples is same, then the average slope is calculated)

Samples: Total data points taken which determines time up to which data is collected. A value of 100 is approximately 20 seconds. Increase sample value, to increase data collection time. Generally an increase in samples can increase sensitivity especially in matrices such as waste water.

Scale: Slope of the line that correlates the rate of fluorescence increase vs. concentration. This value is determined by the 3-point calibration. Some sensors have a default scale that is automatically calculated from other sensor's scales. In this case, "Auto" will be indicated in the default scale field. A new 3-point calibration will supersede the default settings.

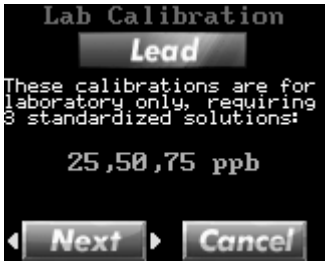
Offset: Intercept of the line that correlates the rate of fluorescence increase vs. concentration. Also automatically determined by the 3-point calibration.

Delay: Points from the start of the test which are not used for calculations. This is used when there is a delayed reaction in certain sensors.

R2: R-Squared is a statistical term indicating how good one term is at predicting another. In our case, this is derived from the best fit line created by the 3-point lab calibration. Values closer to 1 are better.

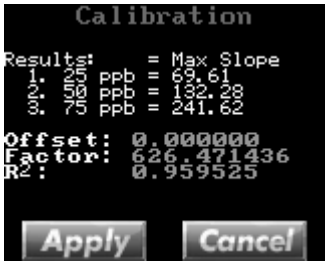
3-Point Lab Calibration

Using the left/right keys in the Advanced menu, Select the Calibrate option.



When all (3) solutions have been tested, the calibration results screen will be displayed. Click Apply to save the results. The settings will then be viewable in the Advanced screen.

Note: This is for laboratory calibration ONLY and requires (3) standardized solutions from manufacturer or prepared by a laboratory technician.



Factory Reset

The Reset option will restore the setting of **that specific sensor** to factory settings.

Using the left/right keys in the Advanced menu, Select the Reset option.

Select Reset on the Warning screen to complete the process.

4.7 Firmware Update

ANDalyze is continually adding new features and options to the AND1000 through new firmware updates. To update your AND1000 firmware, please visit andalyze.com and log in to register your device. Once logged in, you will see the option to update your device. Follow the instructions.

4.8 InstraComm Lite

This software allows users to launch and record live sample results, download all sample results from the instrument and perform related configuration tasks. The InstraComm application was developed by Autonomous Innovations, Inc. and a complimentary "Lite" version has been made available with the purchase of ANDalyze's AND1000. To download your complimentary version of InstraComm Lite, please visit andalyze.com and log in to register your device. For additional information and operating instructions see InstraComm Lite Solutions Notes (Available separately).

5 Site Set-Up and Management

This section provides information concerning the set-up and management of Sites. As different sample locations contain different water characteristics (sample matrix) it is recommended to create a new site for each sample area. This allows the user to track and compare the results at each location while also normalizes the results through an on-site calibration.

5.1 New Site Set-Up

Sites are important because each water sample contains differences which affect testing results. It is recommended that each location is site calibrated. So by creating, calibrating and selecting that site in the future, this calibration can be used repeatedly. **Please see the specific Testing and Calibration Manual for detailed instructions.**

To create a new site:

1. Scroll to the "**Site**" field and press "**Select"**.

2. Using the up-down keys, select "**New Site**".

3. Enter the name of the location (8 characters max) and press "**Save**".

4. f Sensor Lot option is turned ON, you will have the option to enter the lot of the sensors.

5. If the Temperature option is turned ON, you will have the option to enter the temperature of the sample water.

5.2 On-Site Calibration

When testing water at a new location, the instrument has to be calibrated for accurate readings. Completing the On-Site Calibration requires two separate solutions and tests. At the end of the process, the fluorimeter is calibrated for testing water at that site and also provides the lead test results for this site. A calibration may only be accurate when originally performed. Do not rely on a calibration to be accurate over long time periods as environmental samples can vary greatly.

The On-Site calibration process adjusts for changes in sample matrix (such as ionic strength and pH) by calculating the recovery of a known spike in that matrix. When a user performs an on-site calibration for Lead, for example, the fluorimeter software calculates the ppb of lead in the sample (a) and the ppb of lead in sample spiked with 25 ppb lead (b) using the calibration curve from the 3 point calibration (initially completed at factory or in laboratory). It then calculates an accuracy factor based on % recovery. Accuracy factor = 25/b-a. This factor is stored for a particular site that the user enters. The sample concentration displayed after an on-site calibration = a * accuracy factor.

Important: On-Site calibration must be performed if testing is being done:

- At a new location which has not been previously saved.
- To adjust for significant changes in sampling temperature.
- When beginning to use a new lot of sensors.

See the specific Testing and Calibration Manual for detailed instructions.

5.3 Selecting a Site

1. On the Home screen select the Site option.
2. Using the up-down keys highlight the desired site and press Select.
3. On the Site/Sensor Details, choose Select.

5.4 Deleting a Site

1. When in the Site/Sensor Details screen, using the left-right keys, scroll to Delete and select.
2. On the Confirm Delete screen, select Delete.

5.5 Re-Calibrating a Site

1. When in the Site/Sensor Details screen, using the lef-right keys, scroll to Calibrate and select.
2. Follow instruction to calibrate.

6 Maintenance

- **CAUTION:** Always disconnect power from the instrument before attempting any cleaning operations.
- **Important:** Under no circumstances should the instrument, display or the accessories be cleaned with solvents such as white spirit, acetone, etc.

Fluorimeter

- Clean the enclosure, sample cell compartments and all accessories with a soft damp cloth. A mild soap solution can also be used. Do not get excess water in the sample cell compartments. Do not insert a brush or sharp object into sample cell compartment to avoid damaging the mechanical components. Dry the cleaned parts carefully with a soft cotton cloth.

Display

- Take care not to scratch the display. Do not touch the screen with ballpoint pens, pencils or similar pointed objects.
- Clean the display with a soft, lint-free and oil-free cotton cloth.
- Diluted window cleaner liquid can also be used.

Sample Chamber

- Splashes or spills on and in the instrument should be cleaned up immediately. Remove any liquid inside the sample chamber by using a non-lint swab. Do not tip the instrument to empty liquid from the sample chamber.

Sensors

- Never reuse sensors! Once the sensor bag is exposed to air, it should be used immediately (within 30 minutes) as exposure to humidity, air and/or heat can affect its effectiveness. Dispose used sensor and all other used consumables such as sample tubes, syringes, plastic pipettes after each analysis.

Pipettes

- The 100µL automatic pipette can be reused as it uses disposable pipette tips. Pipette tips should be disposed of immediately after use.

7 Customer Service Contact Information

Contact us by Email:

info@andalyze.com

By Telephone:

888 388 0818 (Toll Free in US) or +1 857 453 6740

By Fax:

+1 857 386 1277

Business Service Hours:

9:00am to 5:00pm Eastern Standard Time (USA)

Company Address:

ANDalyze Inc.
800 Boylston Street
Prudential Tower, Floor 16
Boston, MA 02199 USA

Website:

www.andalyze.com

8 Consumables and Replacement Items

- Fluorimeter Kit
  - Capable of measuring multiple metals.
  - Kit Includes: Fluorimeter
    USB to MINI-B Cable
    100µL Fixed Volume Pipette and Tips
    pH Test Strips
- Sensor Kits
  - Equipment for (25) Tests and/or Calibrations
    Kit Includes: (25) Sensor Bags with Sensor & Cuvette
    (25) Sample Tubes (with buffer)
    (25) 1 mL Syringes
    (25) Disposable Transfer Pipettes (Not included in High Range Copper)
    8 mL Analyte Standard Solution
    Instruction Manuals
    Material Safety Data Sheets (MSDS)

9 Technical Specification for AND1000 Fluorimeter

The *AND1000 Fluorimeter* is a platform centric hand-held device for heavy metals testing for drinking water and industrial water supplies. It uses an extremely sensitive measurement technique to determine the levels of heavy metal contamination.

Instrument Specifications:

Light Source:	Light Emitting Diode
Detector:	Photomultiplier Tube
Filters:	Excitation 485nm
	Emission 535nm

AND1000 Fluorimeter

Certifications:

CE Marked: Complies with the following European Union Directives:

- Low Voltage Electrical Equipment Directive 2006/95/EC
- Electromagnetic Compatibility (EMC) Directive 2004/108/EC

Power Specifications

Power:	Battery Operated
Power Recharging:	via USB cable
Power usage:	The battery lasts over 225 tests on a full charge (at 45 seconds/test).

Mechanical Specifications

Dimensions:	Width: 3.6 inches/9.14 cm
	Depth: 8.0 inches/ 20.3 cm
	Height: 2.25 inches/ 5.72 cm
	Weight: 1.25 lb/565 g
IP rating	IP54 (water resistant)

Data specifications

Interface:	USB 2.0
Data:	Downloaded in csv format

Note: *All specifications are subject to change without notice.*

10 Limited Warranty for Fluorimeter Device

ANDalyze provides the following limited warranty for the ANDalyze AND1000 Fluorimeter device (the "**Fluorimeter Device**"). ANDalyze warrants that the Fluorimeter Device (including the software used on the Fluorimeter Device), when used in accordance with the user documentation, will operate in all material respects in conformity with the specifications stated in the user documentation for a period of ninety (90) days from the date of your receipt (the "**Warranty Period**"). If it does not, your sole remedy and ANDalyze's total liability for such material nonconformity in the Fluorimeter Device will be, at ANDalyze's option and discretion, to repair or replace the Fluorimeter Device at ANDalyze's expense or to refund the purchase price (but not any taxes, export or shipping fees) and subject to the limitations in The foregoing remedy is subject to the Limitation of Liability in Section 15 of these terms. To qualify, you must notify ANDalyze during the Warranty Period of any problems that you experience with the Fluorimeter Device. ANDalyze will have no liability for any nonconformity of which you fail to notify ANDalyze prior to the expiration of the Warranty Period. This warranty does not apply to (i) Fluorimeter Device which has been used in a manner other than as authorized under these Terms and the documentation provided with the Fluorimeter Device (including the product brochure and fluorimeter specifications); (ii) any software on the Fluorimeter Device that has been modified by you or any party other than ANDalyze or which has been improperly installed to the extent such modification or improper installation caused the breach of warranty; (iii) failures caused by accident, neglect, failure to maintain a suitable operating environment, tampering, or any other event other than ordinary use.

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