ANDalyze
AN AlpHa MEASUREMENT SOLUTIONS BRAND

Document: 33AND001-DOC22

AND1100 Fluorometer for Water Testing User Manual

April 2014

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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, will result in death or serious injury.

'WARNING'
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 Note:' 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

WARNING

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.
- The single-use reagents (liquid buffer with sample and/or spiked standard) are not considered harmful to people or the environment and do not require special disposal. Any unused high-concentration standard solutions (used for calibration) should be disposed in accordance with local and national regulations. The plastic components in the sensor kits are made of recyclable materials. All plastic waste produced during the use of this product can be disposed of in normal public receptacles per local waste disposal or plastics recycling guidelines.
- 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 AND1100™ Fluorometer 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 fluorometer 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 AND1100 Fluorometer. 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 and Dust 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 fluorometer 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 AlpHa Measurement Solutions 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

WARNING

Fire/Explosion Hazard. The lithium ion battery pack contained in this product is not user replaceable.

Note: Device requires a USB charging port capable of supplying 500 mA at 5 Volts.

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). If the battery indicator is red, indicating the battery is at 25% capacity, please charge the instrument prior to using.

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).

Note: When the meter is charging, the battery indicator will display yellow lines across and around the indicator.

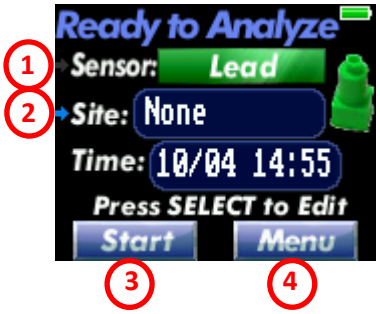
4.2 Home Testing Screen

Options can be accessed by:

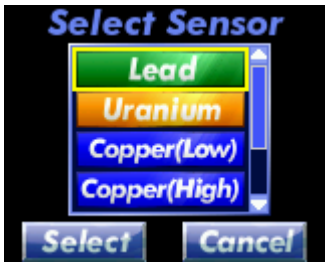
- Using the **up/down** buttons and pressing **SELECT** button when the arrow is to the left of the desired option.
- OR by pressing the button located just below the screen under the desired options at bottom.

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

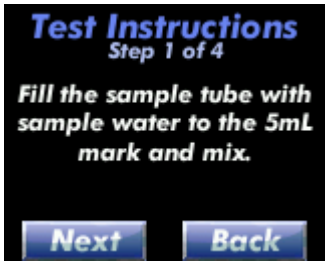
Selecting the Site option allows the user to change or create new sites.

Sites are important because each water sample contains differences which affect testing results. It is recommended that each location is calibrated. By selecting a site the 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 with 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.**

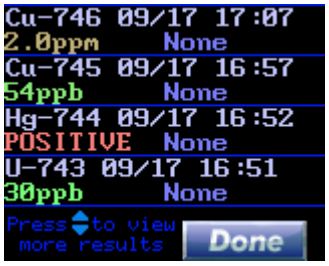
Selectable Options:

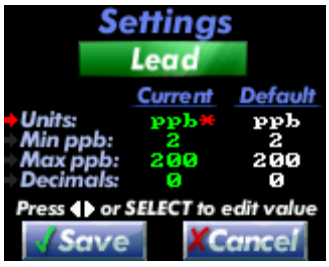
1. **Results**
2. **Settings**
3. **Options**
4. **Advanced**
5. **About**
6. **Date/Time**
7. **Help**

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

Results

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





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.

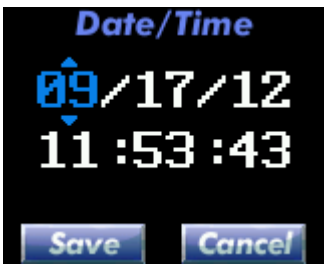
About

- 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.**



- **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.

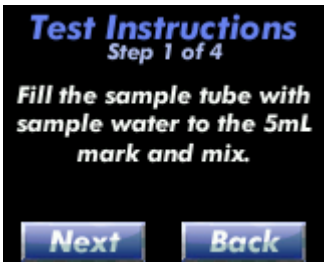
Options

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.



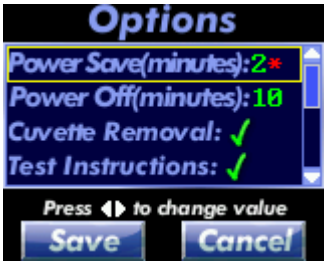
Advanced

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

Help

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



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.

Language: Choose between English, Chinese, Portuguese, Spanish and German languages for the Fluorometer displays.

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.

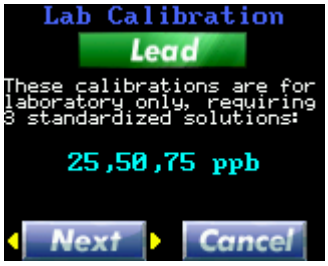
Offset: Intercept of the line that correlates the rate of fluorescence increase vs. concentration. Also automatically determined by the 3-point calibration.

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

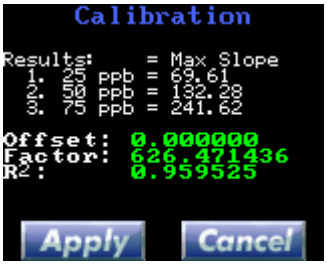
Note: This is for laboratory calibration ONLY and requires (3) standardized solutions from manufacturer or prepared by a laboratory technician.

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.

the results. The settings will then be viewable in the Advanced screen.



Select Reset on the Warning screen to complete the process.

4.7 Firmware Update

To update your AND1100 firmware, please visit andalyze.com and contact the Customer Service team at AlpHa Measurement Solutions.

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 AND1100. 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.**

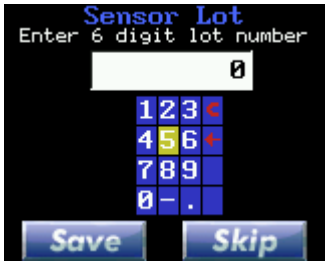
To create a new site:

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. If 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 Fluorometer is calibrated for testing water at that site and also provides results of desired sensor for that sample. 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 Fluorometer 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 Note: 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, press **Select**.

5.4 Deleting a Site

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

5.5 Re-Calibrating a Site

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

6 Maintenance

CAUTION: *Always disconnect power from the instrument before attempting any cleaning operations.*

Important Note: Under no circumstances should the instrument, display or the accessories be cleaned with solvents such as white spirit, acetone, etc.

Fluorometer

- 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 fixed-volume 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:

andalyze@alpHa-measure.com

Contact us by Telephone:

USA +1 832.456.4100

Business Service Hours:

8:00am to 5:00pm Central Standard Time (USA) Monday through Friday

Company Address:

AlpHa Measurement Solutions, LLC

10540 Rockley Road
Houston, TX 77099

Websites:
www.andalyze.com
www.alpha-measure.com

8 Consumables and Replacement Items

- Fluorometer (*AlpHa Part Number: 33AND001-SK*)
  - Capable of measuring multiple metals
  - Starter Kit Includes: (1) AND1100 Fluorometer
    (1) USB A to Mini-B Cable
    (1) Lead Sensor Starter Kit (3-Pack)
    (1) User Manual

- Sensor Kits
  - (Part Numbers: *Lead 33AND010 / Uranium 33AND011 / Mercury 33AND014 / Zinc 33AND015 / Cadmium 33AND016 / Copper 33AND0*17)
  - Equipment for (25) Tests and/or Calibrations
    Kits Typically Include: (25) Sensor Bags with Sensor & Cuvette
    (25) Sample Tubes (with buffer)
    (25) 1 mL Syringes
    (15) Disposable Transfer Pipettes (Not included in High Range Copper)
    (1) 5 mL Analyte Standard Solution
    (1) Instruction and SDS QR Code Card

9 Technical Specification for AND1100 Fluorometer

The *AND1100 Fluorometer* 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

Source Lamp: Light Emitting Diode (LED)
Detector: Photomultiplier Tube
Filters: Excitation 485nm

Emission 535nm

Display

AND1100 Fluorometer

Type: Passive Matrix OLED Screen
Size: 1.7" diagonal size, 33.6mm x 27mm
Resolution: 160 x 128 resolution, 65K true to life colors

Compliance

European CE Mark
ISO 9001:2008 Certified Assembly

Power

Source: Rechargeable lithium ion battery pack
Power Recharging: via USB cable
Power Usage: The battery lasts over 225 tests on a full charge (at 45 seconds/test).

Mechanical

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
Enclosure Rating IP54 (water & dust resistant)

Data

Interface: USB type Mini-B
Data Storage: 1000 site/sensor combinations (Result, Site, Date, Time, Sensor)
Format: Downloaded in csv format. Exportable from InstraComm Lite into txt or xls formats.

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

10 Limited Warranty for Fluorometer Device

AlpHa Measurement Solutions ("AlpHa") provides the following limited warranty for the ANDalyze AND1100 Fluorometer device (the "**Fluorometer Device**"). AlpHa warrants that the Fluorometer Device (including the software used on the Fluorometer 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 (1) one year from the date of your receipt (the "**Warranty Period**"). If it does not, your sole remedy

and AlpHa's total liability for such material nonconformity in the Fluorometer Device will be, at AlpHa's option and discretion, to repair or replace the Fluorometer Device at AlpHa'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 as described wherein. To qualify, you must notify AlpHa during the Warranty Period of any problems that you experience with the Fluorometer Device. AlpHa will have no liability for any nonconformity of which you fail to notify AlpHa prior to the expiration of the Warranty Period. This warranty does not apply to (i) Fluorometer Device which has been used in a manner other than as authorized under these Terms and the documentation provided with the Fluorometer Device (including the product brochure and Fluorometer specifications); (ii) any software on the Fluorometer Device that has been modified by you or any party other than AlpHa 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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