# LIMS Entry for Laboratory Parameters

## DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF LABORATORIES BIOLOGY SECTION TALLAHASSEE FLORIDA



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## 1. SCOPE AND APPLICATION

1.1. This method is used to ensure that entry of all parameters (Conductivity/Salinity, Dissolved Oxygen, and pH, Ammonia, Chlorine, Hardness, and Alkalinity) are entered into LIMS with accuracy and consistency. The methods outlined will be used to provide accurate documentation of data values obtained from the DO meter, pH meter, conductivity meter, Ammonia Colorimeter II, Chlorine Colorimeter II, Hach Alkalinity kit, and Hach Hardness kit.

## 2. SUMMARY OF METHOD

2.1. Lab samples are measured for their respected endpoints. All values obtained from readings must be transcribed into LIMS in an expedited manner with no errors.

2.1.1. Interferences include contaminated glassware, airborne particulates (including dust and microscopic organisms), and improperly prepared samples.

2.1.2. Cross contamination of samples can lead to inaccurate readings. A lack of triple rinsing of the meter probes in between samples and concentrations can lead to inaccurate readings. The analyst must make sure that all samples and concentrations are organized appropriately to prevent cross contamination.

2.2. Data entry of all values obtained must be entered as shown by the corresponding meters to reflect true values of all samples.

## 3. EQUIPMENT AND SUPPLIES

3.1. YSI MultiLab 4010-1 meter (SOP TA-06.44)

3.2. Fisherbrand accumet AB315 pH/mV meter (SOP TA-06.43)

3.3. Traceable Bench Conductivity/Salinity Meter (SOP TA-06.36)

3.4. Traceable Thermometer

3.5. Hach Chlorine Pocket Colorimeter II (SOP TA-06.22)

3.6. Alkalinity (Hach Kit) and Hardness (Hach Kit) (SOP TA-06.08)

3.7. Hach Ammonia Nitrogen Pocket Colorimeter II Test Kit (SOP TA-06.35)

3.8. Computer with access to LIMS

## 4. THERMOMETER

4.1. The DO and pH meters require a calibration check for the Automatic Temperature Compensation (ATC) probes. A logbook entry must be done before the DO and pH meters are used in sample testing.

4.2. For entry of data, open LIMS. Go to Laboratory > Technical > Laboratory Logbook > TOX_THERMOMETER.



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4.3. For entry of the calibrated thermometer against the ATC pH probe, click on the last entry with the Sub_Category labeled pH.

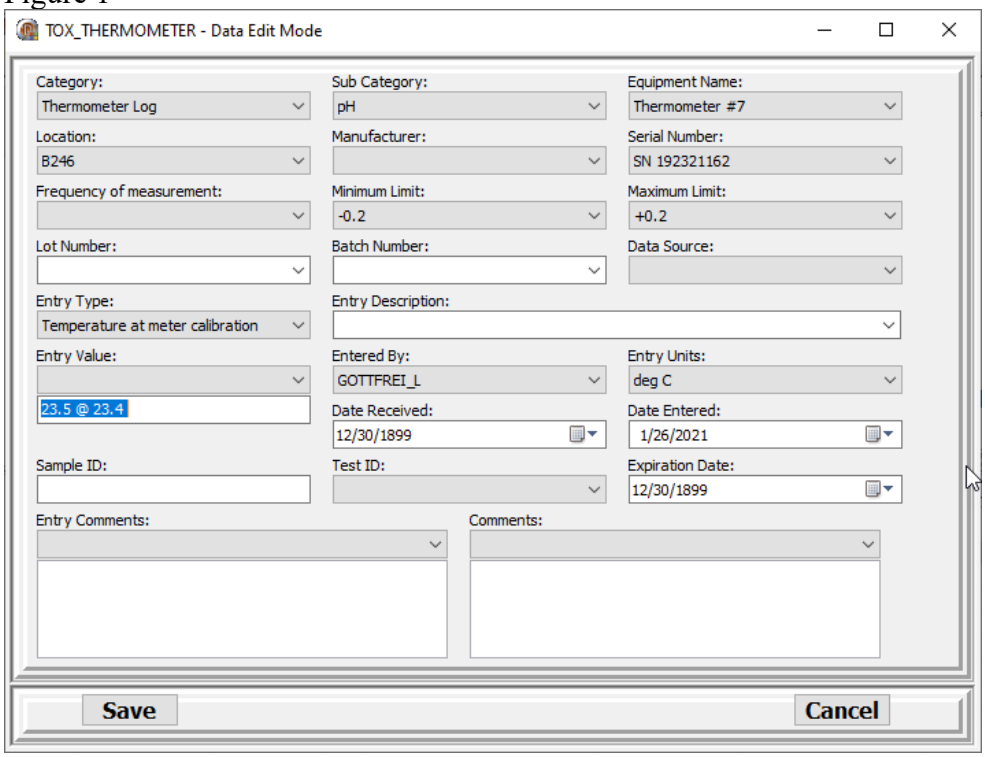
4.4. Ensure that the Equipment name and Serial number fields match the information for thermometer being used.

4.5. The pH temperature reading should be within 0.2℃ of the NIST certified thermometer reading.

4.6. In the Entry value field, the pH meter temperature reading will be listed first, then the reference thermometer. For reference refer to Figure 1.

4.6.1. Example: pH meter ATC probe reads 23.5. The reference thermometer reads 23.4. The entry should read 23.5 @ 23.4.

4.7. Figure 1




4.8. For entry of the thermometer against the DO meter, click on the last entry with the Sub_Category labeled DO.

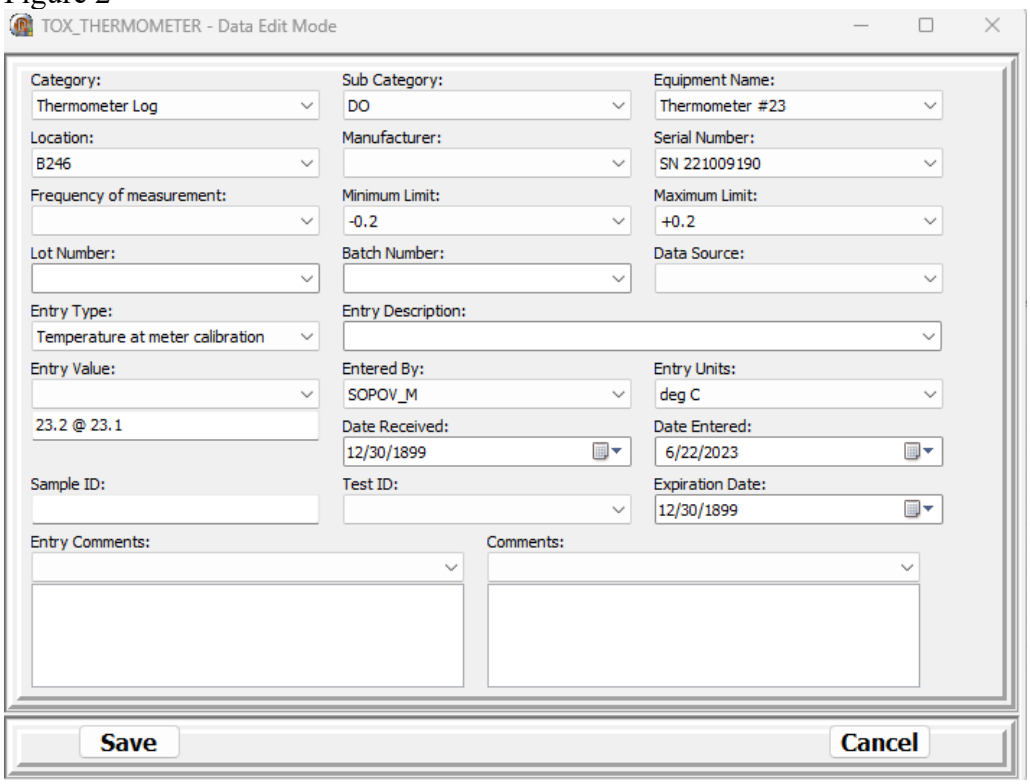
4.9. Ensure that the Equipment name and Serial number fields match the information for the thermometer that you are using.

4.10. Both thermometers should read within 0.2 degrees C of each other.

4.11. In the Entry value field, the DO meter temperature reading will be listed first then the reference thermometer. For reference refer to Figure 2.


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4.12. Figure 2




## 5. CONDUCTIVITY/ SALINITY

5.1. Conductivity calibration data entry must be done before any sample is tested.

5.2. Calibration of the Traceable Bench Conductivity Meter should be performed in accordance with SOP TA-06.36.

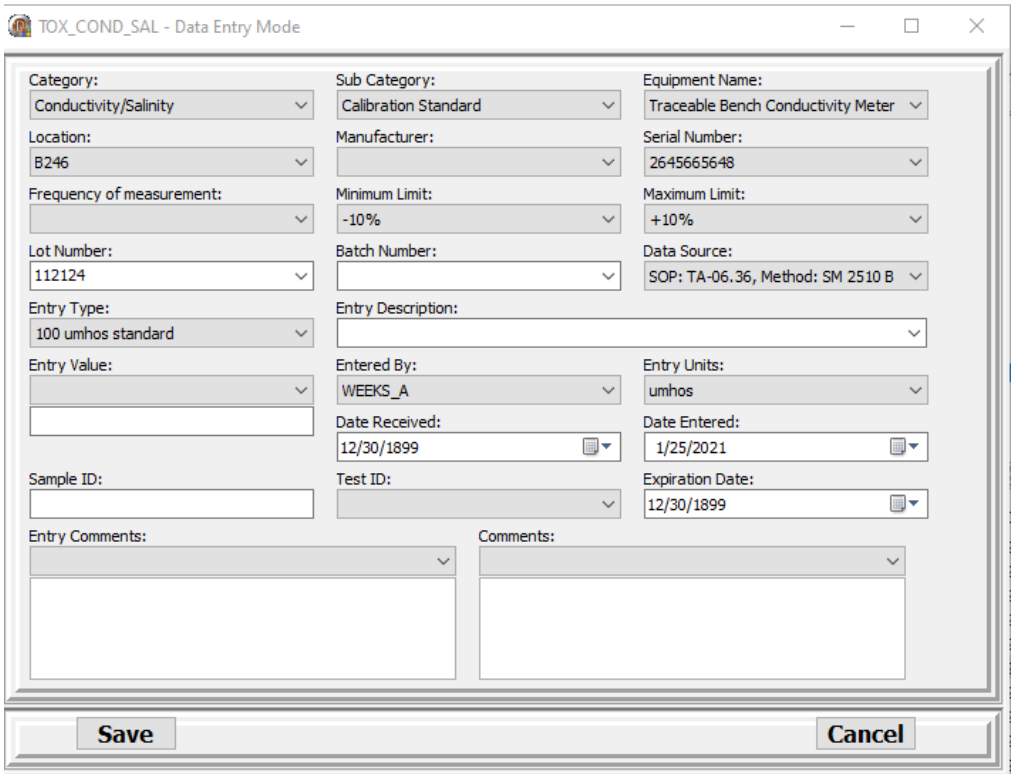
5.3. Open LIMS. Go to Laboratory > Laboratory Logbook > TOX_COND_SAL.

5.4. To enter the low standard (100 µhmos standard), click on the latest entry to pull up the data entry page as shown in Figure 3.



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5.5. Figure 3




5.6. The Entry Type field should correspond to the standard or sample that the analyst is measuring. The category should read “Conductivity/Salinity” and the sub-category should read “Calibration Standard”.

5.7. The ‘Lot Number’ box is filled in with the standard’s LIMS number located on the bottle.

5.8. The “Entered by” and “Entry Date” will auto populate.

5.9. Enter the value from the meter in the ‘Entry Value’ box.

5.10. The temperature of the medium (1,000 µmhos) standard should be taken and entered in the Comments box. The comment should read “med temp = XX.X degrees C.” Once all fields have been filled out the analyst can then hit save. (Note: After clicking save, clicking refresh will populate the new entry.)

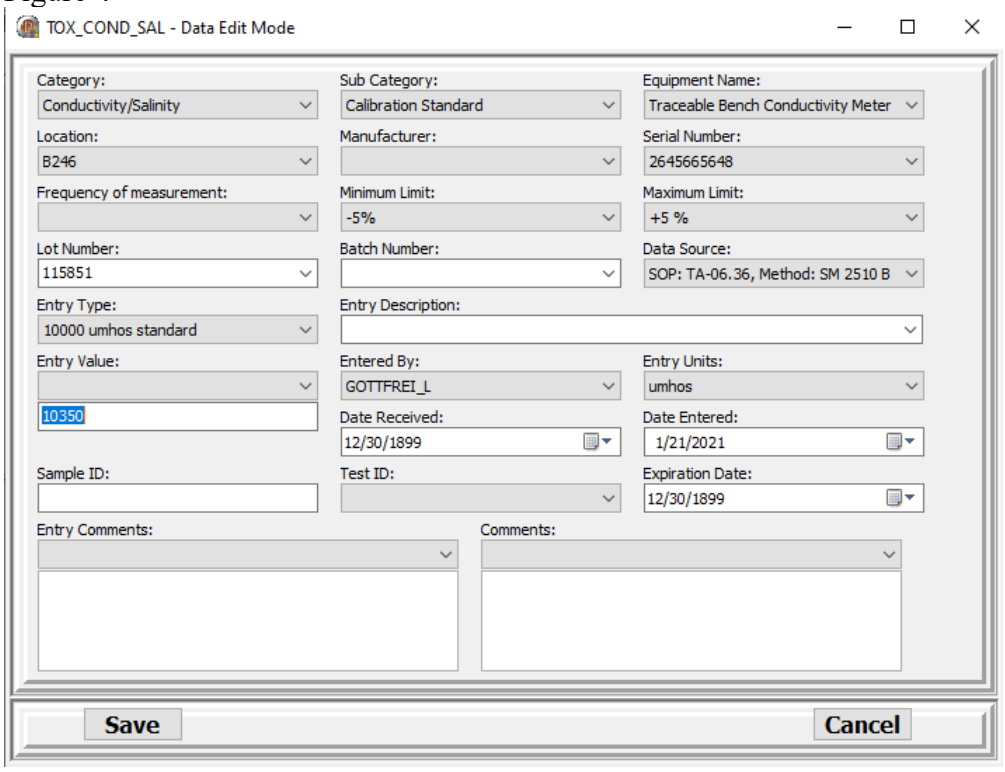
5.11. Find and click on the most recent entry that is labeled 10,000 µmhos standard.

5.12. Before clicking, the saved entry should resemble Figure 4.



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5.13. Figure 4




5.14. Entry of a Facility sample or Lab Water sample.

5.14.1. For data entry of a sample, the analyst will look for the last Entry_Type labeled as “Sample Conductivity”.

5.14.2. In the ‘Lot Number’ field, the LIMS number for the sample or dilution water should be entered. For DI water, well water, and facility samples no lot number will be entered.

5.14.2.1. For facility samples, the sample number is entered in the ‘Sample ID’ box. This can be filled out at a later date if the sample has not been given a LIMS number at the time of data entry.

5.14.3. The ‘Batch Number’ box is filled in for samples being measured and is typically the day the sample was made or collected (DI water or well water); if it is organism water or facility water enter the day it arrived.

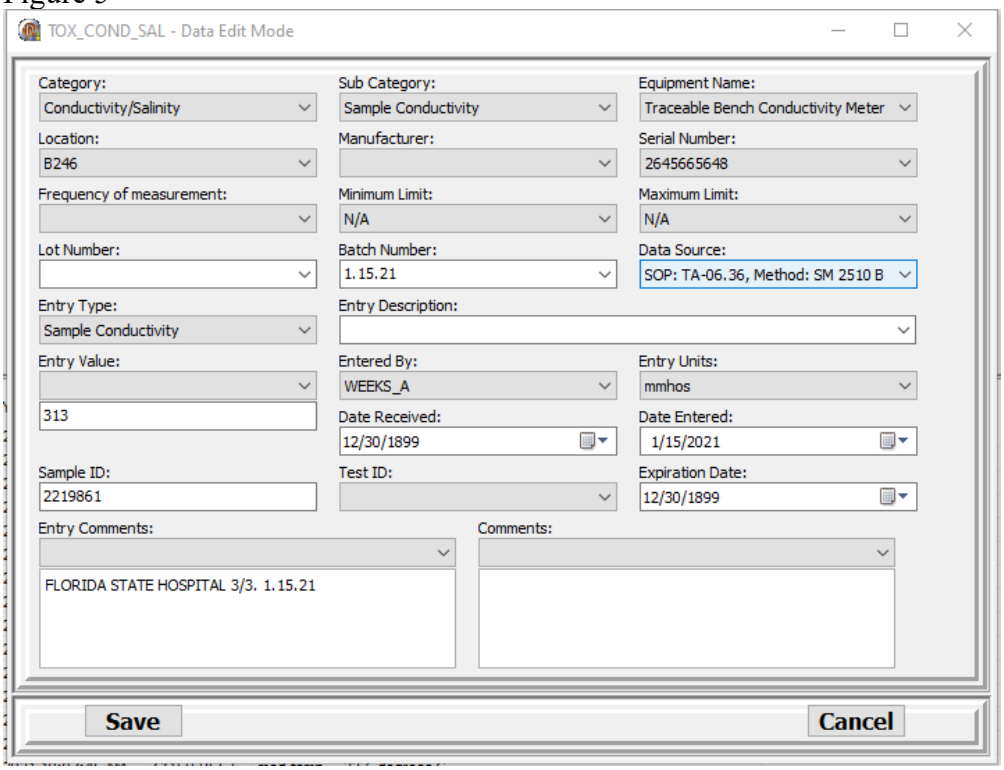
5.14.4. The “Entry Value Field” should be filled out with the measurement obtained from the Traceable Bench Conductivity Meter.

5.14.5. For the “Entry Comments”, the following information should be entered as follows for a facility: Facility/sample type, Batch number (day sample arrived). Refer to Figure 5 for example. For in-house waters, the comment should read “water type, batch number, LIMS number” (for example: “MHWCD 2.1.21, 123456.”).



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5.15. Figure 5




5.16. Entry of the End of Day (EOD) Check/Afternoon check.

5.16.1. For the entry of an EOD Check, double click on the last Entry_Type of 1000 µhmos standard.

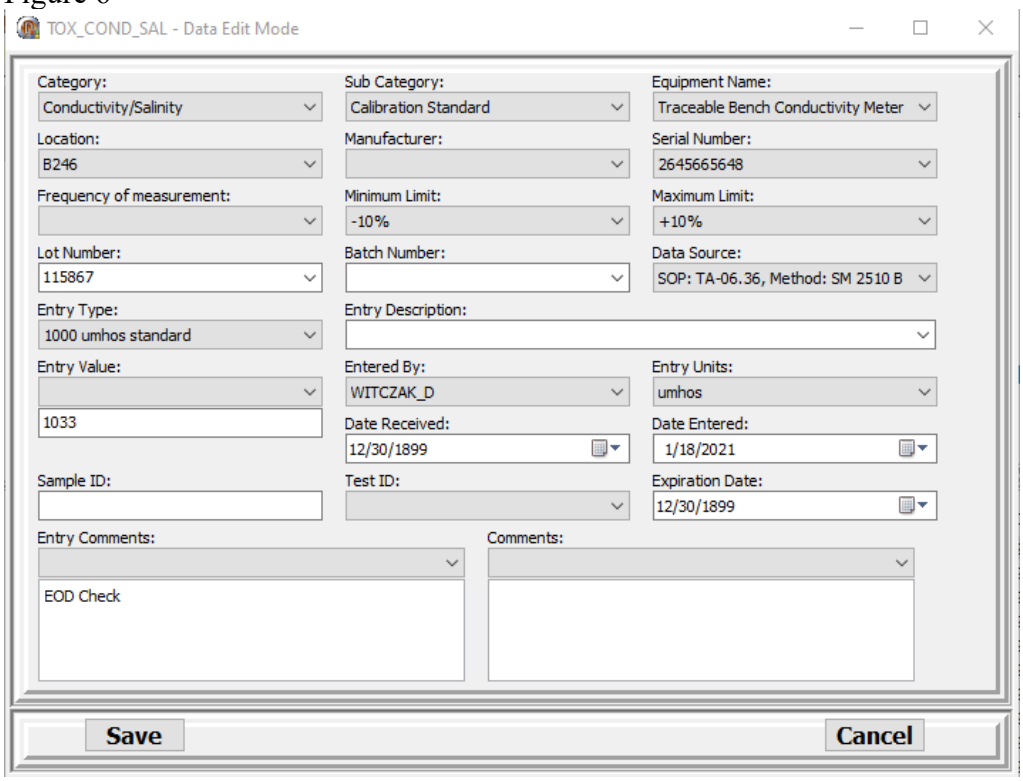
5.16.2. The Lot Number should be filled in with the LIMS label number that is on the Medium Standard bottle used for the check.

5.16.3. For the entry comment, the following comment should be typed in, “EOD Check”. Refer to Figure 6 for a completed entry.



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5.17. Figure 6




5.18. Salinity values should also be entered into LIMS in sequence.

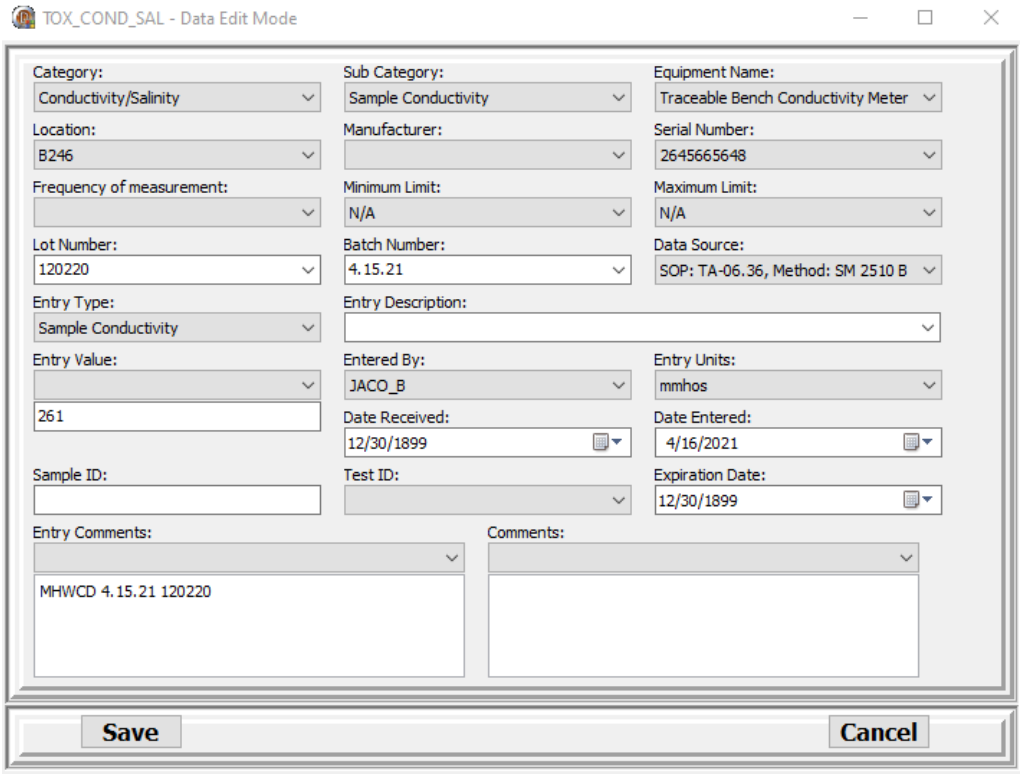
5.18.1. Salinity standard is measured with the conductivity probe and meter. ~25 mL of 35 ppt standard is poured into a 30 mL plastic cup. The meter is switched to salinity mode and the probe is gently swirled in the cup. The salinity needs to be within ± 2 ppt of the standard.

5.18.2. The salinity standard check value is entered by selecting the “Salinity Standard” subcategory. Enter the value obtained from the meter in the ‘entry value’ box. “Sample Salinity” is the subcategory used when measuring a sample. Entry units will read as ppt. Refer to Figure 7 on how to enter the salinity for ASW.



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5.19. Figure 7

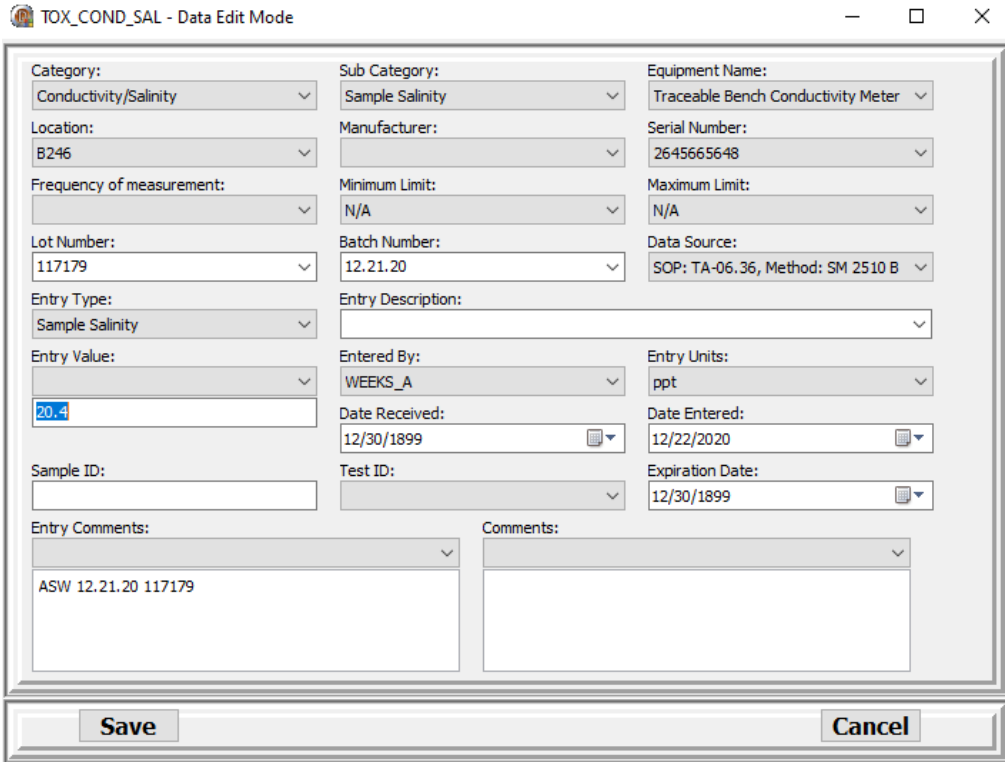



5.20. For both conductivity and salinity of a facility sample or prepared reagent, write the type of sample (facility or prepared reagent) in the 'Entry Comments' box along with the batch number and LIMS number. Refer to Figure 8 for example.



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5.21. Figure 8




## 6. DISSOLVED OXYGEN

6.1. Dissolved Oxygen calibration data entry must be done before any sample is tested.

6.2. Calibration of the YSI MultiLab 4010-1 meter should be performed in accordance with SOP TA-06.44.

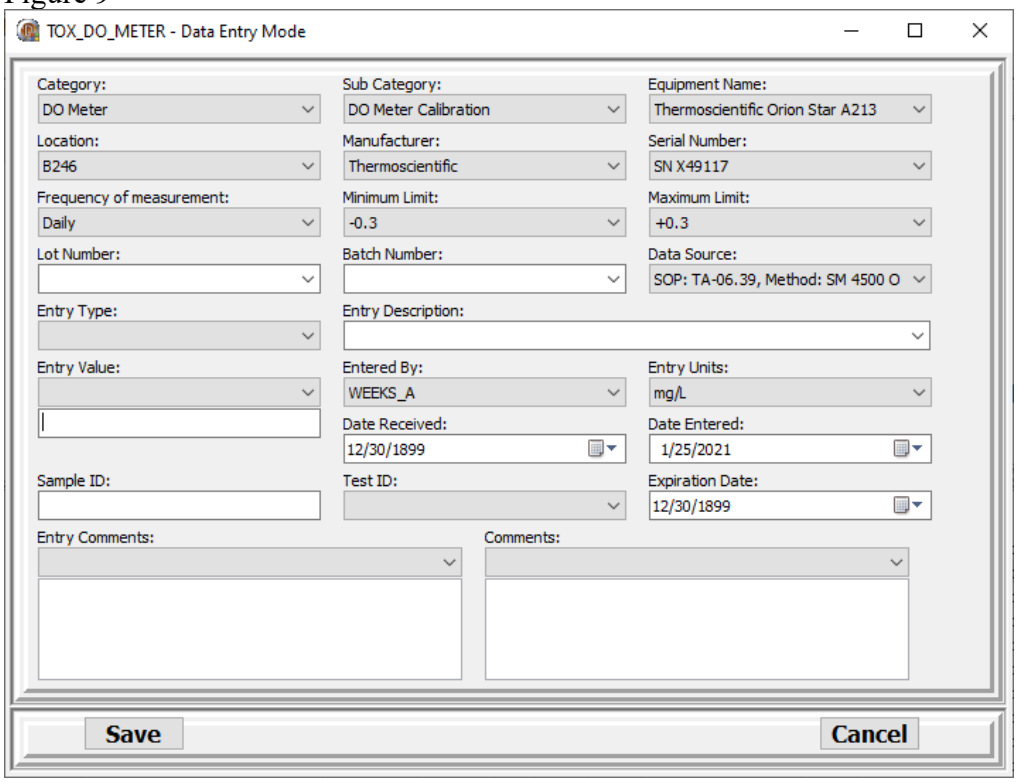
6.3. Open LIMS. Go to Laboratory> Technical > Laboratory Logbook > open TOX_DO_METER.

6.4. To pull up the data entry page as shown in Figure 9, click on the latest DO Meter Calibration entry in the “Entry_Type” field.



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6.5. Figure 9

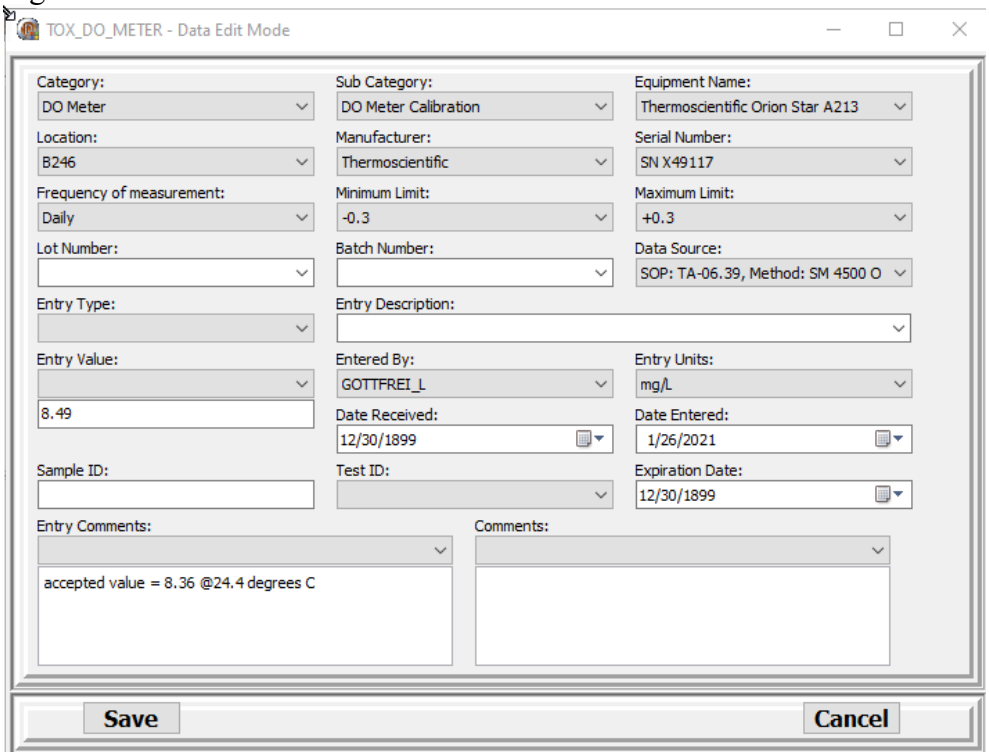



6.6. The reading provided by the YSI MultiLab 4010-1 meter will be entered in the 'Entry Value' field. This reading will then be compared to the Dissolved Oxygen Saturation Table sheet on the wall next to the meter station. The temperature reading on the meter will be compared to the accepted value from the sheet. Both the temperature value and corresponding reading will then be entered in the entry comments section as seen in Figure 10.



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6.7. Figure 10




6.8. The accepted value obtained from the chart and the reading obtained from the meter must be within ± 0.3 mg/L to be within calibration.

6.9. For recording a sample (facility sample, prepared reagent, or organism water) DO, the following process should be followed.

6.9.1. Find the last entry labeled “Sample DO” and open the entry.

6.9.2. The ‘Batch Number’ box is filled in for samples being measured and is typically the day the sample was made; if it is organism water or facility water, it is the day it arrived.

6.9.3. If the sample is a lab sample such as MHWCD, MHW, DI, or Well Water, enter the LIMS number in the ‘Lot number section’.

6.9.4. For a Facility sample, in the ‘Entry Comments’ box enter the facility name, the batch number (day sample arrived), and the date (i.e. Florida State, 2/3. 1.1.21).

6.9.5. When test organisms are received, a DO reading of the shipping water must be taken. Enter the DO measurement with the following comments: name of the species, the test being administered, and the date (for example: “P. prom acute 2.1.21”).

6.10. For dilution waters such as, MHWCD. MHW, DI, and Well Water, enter the sample name and the date the sample was either made or obtained, and LIMS number if applicable. (For example: “DI H2O, 2.1.21” or “MHWCD, 2.1.21, 123456”).

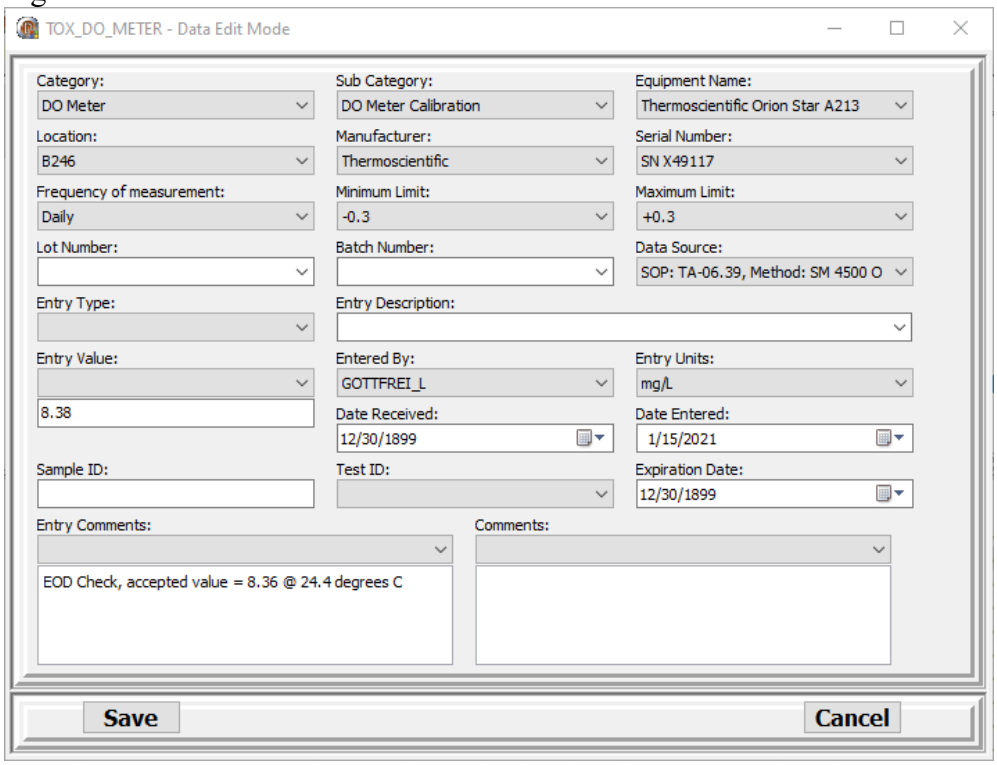

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6.11. At the end of every day, an End of Day (EOD) check will be performed before the meter can be shut down.

6.12. For the EOD check, open the last DO meter calibration that has the entry comments of EOD check.

6.13. The same process as the beginning of day calibration check will be followed except the comment will include the words “EOD Check”. Refer to Figure 11 for a completed entry. For the afternoon check, enter “afternoon check” in the entry comments. This is done 2-hours after the initial calibration.

6.14. Figure 11




7. PH

7.1. LIMS data entry of the pH meter calibration must be done daily before any sample is tested.

7.2. Calibration of the Fisherbrand accumet AB315 pH/mV meter should be performed in accordance with SOP TA-06.43.

7.3. Open LIMS. Go to Laboratory > Technical > Laboratory Logbook > TOX_pH_METER.

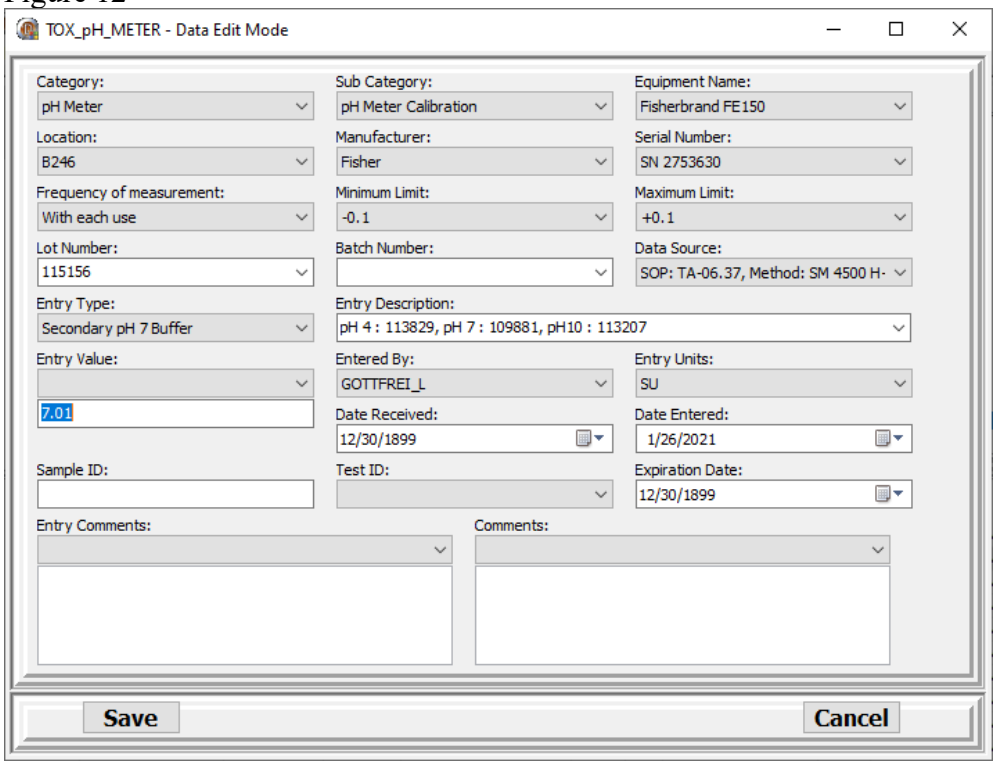
7.4. Measure the Orion pH 7 standard and enter the value in the ‘Entry Value’ field. The pH meter is within calibration if the Orion pH 7 standard reads 7.00 SU ± 0.10 SU.

7.5. In the ‘Entry Description’ box. make sure the LIMS numbers of each standard (pH 4, 7, and 10) is entered correctly.


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7.6. The ‘Lot Number’ box is where the LIMS number for the Orion 7 standard is entered. Refer to Figure 12 for a complete entry.

7.7. Figure 12




7.8. For logging a sample measurement, the following process should be followed.

7.8.1. Open the most recent entry with a ‘Sub_Category’ of “Sample pH”.

7.8.2. Fill in the ‘Batch Number’ box for the samples being measured. The batch number is typically the day the sample was made; or, if it is organism or facility water, it is the arrival day. If the sample is a lab sample such as MHWCD, MHW or ASW, enter the LIMS label number in the ‘Lot Number’ box.

7.8.3. In the ‘Entry Comments’ box, for a Facility sample enter the facility name, the batch (arrival date), and the date (for example: Florida, 2/3, 1.1.21).

7.8.4. When test organisms are received, a pH reading of the shipping water must be taken. Enter the pH measurement with the following comments: name of the species, the test being administered, and the date (for example: “P. prom acute 2.1.21”).

7.8.5. If the sample is a lab sample such as MHWCD. MHW, DI, or Well Water, enter the sample name, the date the sample was either made or obtained, and LIMS number (if applicable). (For example: “DI H2O 2.1.21” or “MHWCD 2.1.21 123456”).

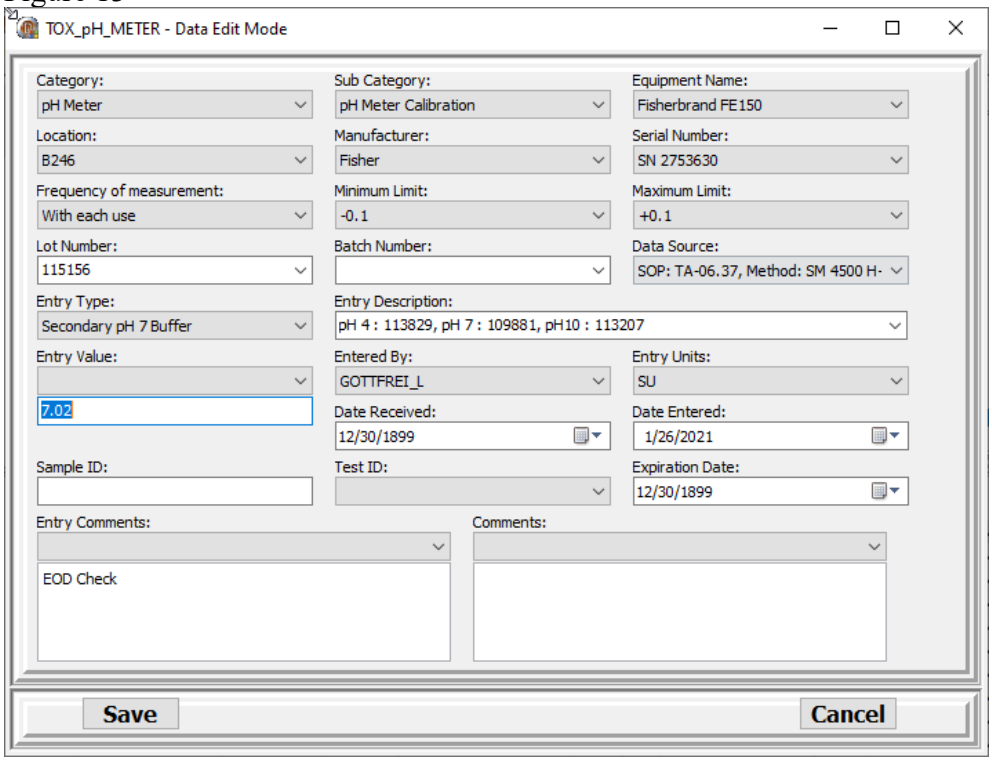
7.9. At the end of every day before the meter can be shut down, an End of Day (EOD) check must be performed.


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7.9.1. For the EOD check, open the most recent pH meter calibration entry that has 'EOD check' in the Entry Comments.

7.9.2. The same process as the beginning of day calibration check must be followed except that the comment will read 'EOD Check'. Refer to Figure 13 for a completed entry.

7.10. Figure 13




## 8. CHLORINE

8.1. Chlorine calibration data entry must be done before any sample is tested.

8.2. Calibration of the Hach Chlorine Pocket Colorimeter II should be performed in accordance with SOP TA-06.22.

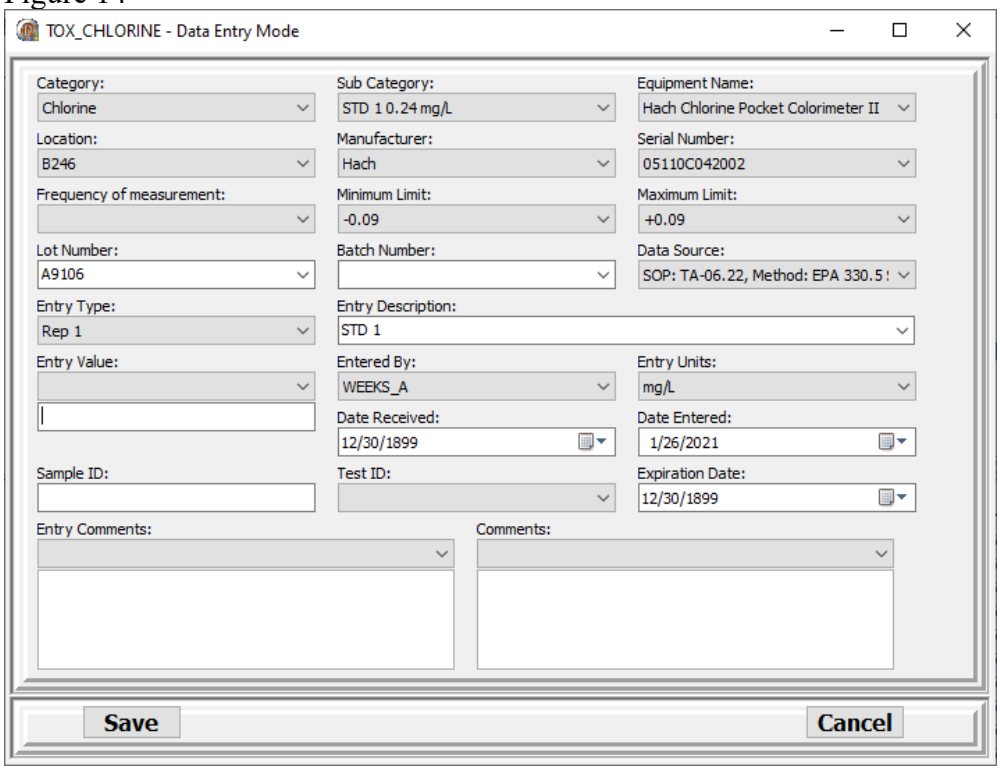
8.3. Open LIMS. Go to Laboratory > Technical > Laboratory Logbook >LIMS > TOX_CHLORINE.

8.4. To enter the calibration standard values, find the most recent entry labeled "STD 1" in the 'Sub_Category' field.

8.5. After clicking the "STD 1" entry, enter the value of STD 1 in the 'Entry Value' field. (Note: Be sure to pay attention to the 'Entry Type' field to make sure you are entering the value for the right standard. Every time 'save' is selected, a new standard will appear. There is a total of three entries.) For a complete entry refer to Figure 14.


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8.6. Figure 14




8.7. Entry of a Facility sample or Lab Water sample.

8.7.1. For data entry of a sample, select the most recent entry with a 'Sub_Category' of Sample Chlorine.

8.7.2. In the 'Lot Number' box, the LIMS number for the "sample" should be entered. For DI Water, Well Water, and Facility samples no Lot number will be entered.

8.7.3. For samples, the 'Batch Number' box is filled in with the date that the sample or dilution water was made; if it is organism water or facility water it is the day it arrived.

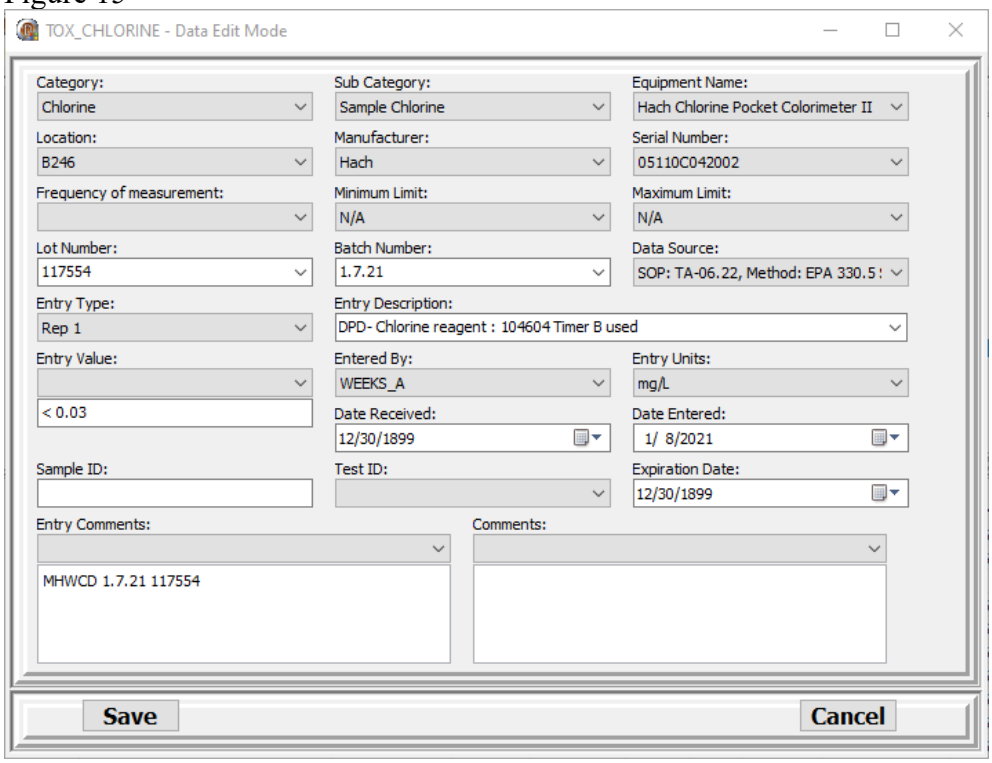
8.7.4. For the 'Entry Value' box, enter the measurement obtained from the Hach Chlorine Pocket Colorimeter II.

8.7.5. For the 'Entry Comment', the following information should be entered: Facility/sample type, Batch number and LIMS number if applicable. Refer to Figure 15 for example. (Note: Make sure to pay attention to the Entry Type field as it will change after every entry.)

8.7.6. In the Entry Description field, ensure that both the timer and reagent LIMS number are accurately recorded. A total of two entries along with a mean entry are required. A fourth entry is only required if a third replicate value is entered. If a third replicate was not performed, the fourth entry field can remain blank.


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8.8. Figure 15




## 9. AMMONIA

9.1. Ammonia calibration data entry must be done before any sample is tested.

9.2. Calibration of the Hach Ammonia Nitrogen Pocket Colorimeter must be performed in accordance with SOP TA-06.33.

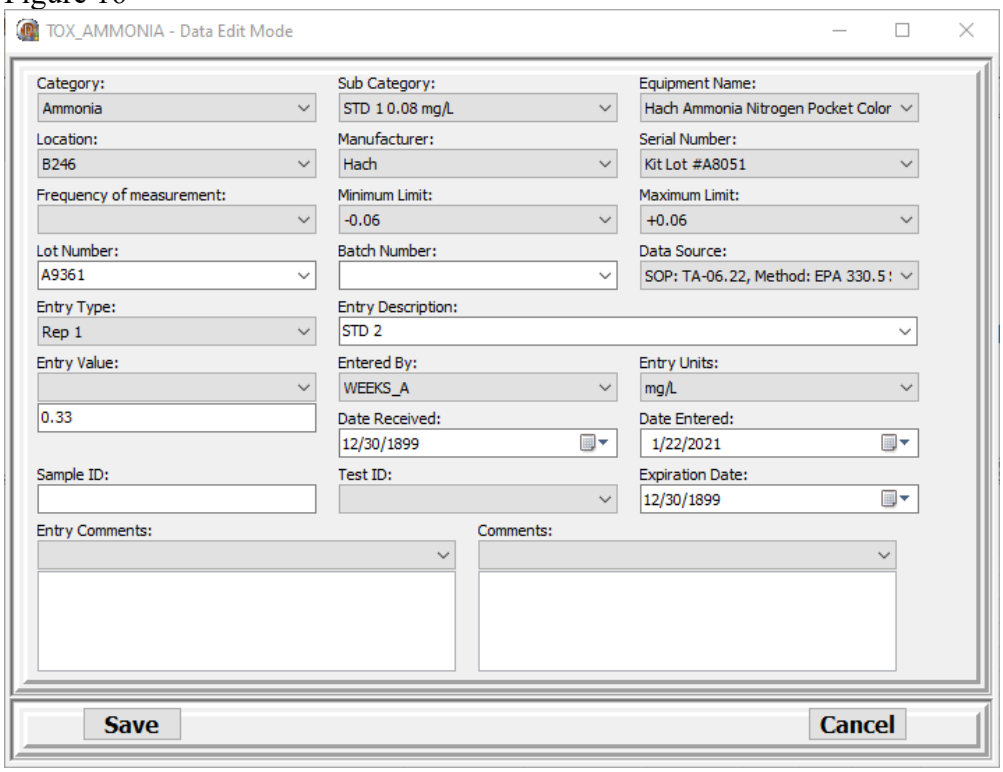
9.3. Open LIMS. Go to Laboratory > Technical > Laboratory Logbook > TOX_Ammonia.

9.4. To enter the calibration standard values, find the last entry labeled “STD 1” in the ‘Sub_Category’ field.

9.5. After clicking the STD 1 entry, enter the value of STD 1 in the ‘Entry Value’ box. (Note: Be sure to pay attention to the Entry Type field to make sure you are entering the value for the correct standard.) A total of two entries along with a mean entry are required. There will also be a blank fourth entry that requires no entry from the analyst. For a complete entry refer to Figure 16.


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9.6. Figure 16




9.7. Entry of a Facility sample or Lab Water sample.

9.7.1. For data entry of a sample, select the most recent entry with the 'Sub_Category' of "Sample Ammonia".

9.7.2. In the "Lot Number" box, the LIMS number for the sample should be entered. For DI Water, Well Water, or Facility samples no Lot number will be entered.

9.7.3. For samples, the 'Batch Number' box is filled in with the date that the sample or dilution water was made; if it is organism water or facility water, it is the day it arrived.

9.7.4. The 'Entry Value' box enter the measurement obtained from the Hach Ammonia Nitrogen Pocket Colorimeter II.

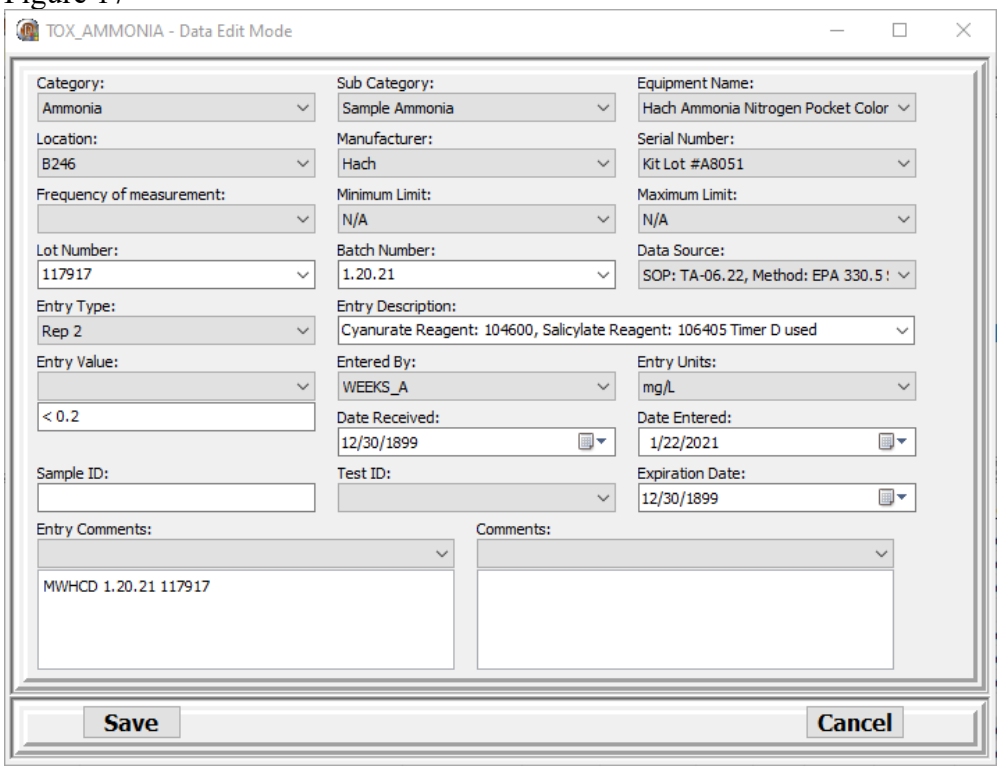
9.7.5. For the 'Entry Comments,' the following information should be entered as follows: Facility/sample type, Batch number. Refer to Figure 17 for example. (Note: Make sure to pay attention to the Entry Type field as it will change after every entry.)

9.8. In the 'Entry Description' box, you will need to make sure that the timer being used is accurately recorded. Record both the Cyanurate Reagent and Salicylate Reagent LIMS numbers for the current packets as well as the Timer ID. See Figure 17. A total of two entries along with a mean entry are required. A fourth entry is only required if a third replicate value is entered. If a third replicate was not performed, the fourth entry field can remain blank.



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9.9. Figure 17




## 10. ALKALINITY

10.1. Two replicates of alkalinity standards must be done before proceeding to testing samples.

10.2. All samples and standards must be measured in accordance with SOP TA-06.08.

10.3. For entry of data, open LIMS, and navigate to Laboratory > Technical > Laboratory Logbook > TOX_ALK_HARD.

10.4. To enter the values for the standards, click on the most recent entry labeled "Alkalinity Standard."

10.5. In the 'Lot Number' box, enter the LIMS number for the standard.

10.6. For standards, the 'Batch Number' box is filled in with the date that the standard was made.

10.7. In the 'Entry Value' box, enter the measurement obtained from the volume needed to titrate the sample multiplied by 100.

10.8. In the entry description field, the LIMS numbers for the current Sulfuric Acid, Phenolphthalein, and pillow packet will need to be checked for accuracy.

10.9. When the save button is clicked, the screen will move to the next entry. At this point, all fields will need to be verified again to ensure that accurate information is entered.

10.10. No comment is needed when entering the standard.

10.11. Entry of a Facility sample or Lab Water sample.


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10.11.1. For data entry of a sample, the analyst will look for the most recent 'Sub_Category' of "Sample Alkalinity".

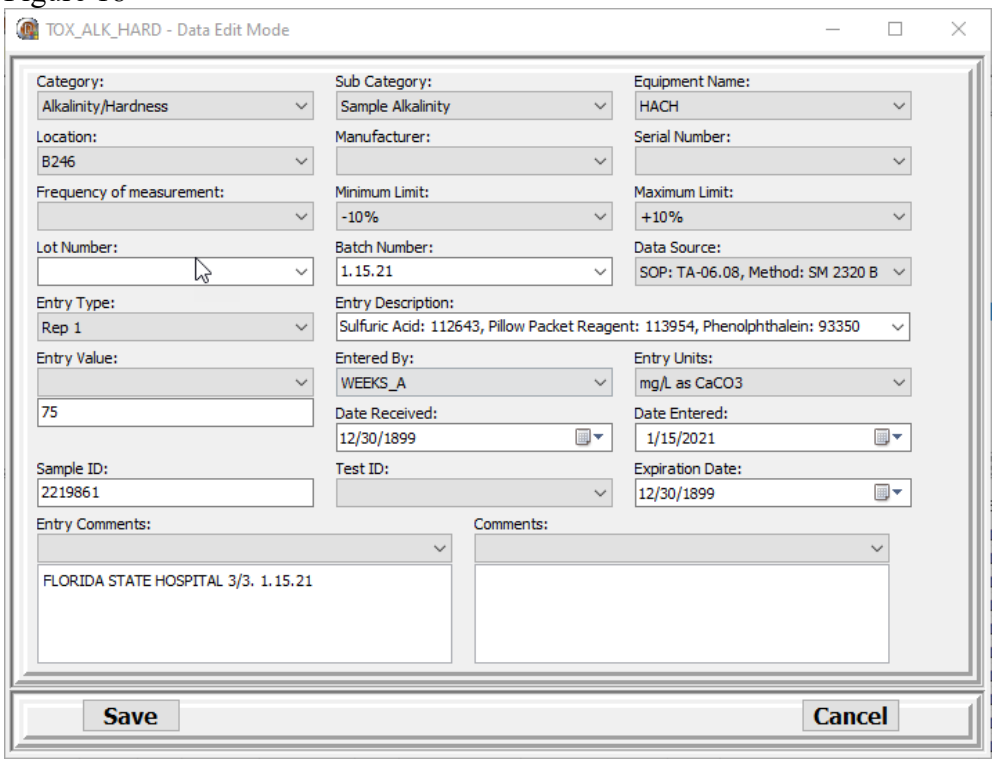
10.11.2. In the 'Lot Number' box, enter the LIMS number of the sample. For DI Water, Well Water, and Facility samples no Lot number will be entered.

10.11.3. For samples, the 'Batch Number' box is filled in with the date that the sample or dilution water was made. For organism water or facility water, the 'Batch Number' is the day it arrived.

10.11.4. For the 'Entry Value' box, enter the measurement obtained from the volume needed to titrate the sample multiplied by 100.

10.11.5. For the 'Entry Comments' the following information should be entered as follows: Facility/sample type, Batch number, and LIMS number if applicable. Refer to Figure 18 for example. (Note: Make sure to pay attention to the Entry Type field as it will change after every entry.)

10.12. Figure 18




## 11. HARDNESS

11.1. Two hardness standards must be done before proceeding to testing samples.

11.2. All samples and standards must be measured in accordance with SOP TA-06.08.

11.3. For entry of data open LIMS and navigate to Laboratory > Technical > Laboratory Logbook > TOX_ALK_HARD.



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11.4. To enter the values for the standards, click on the most recent entry labeled “Hardness Standard.”

11.5. In the ‘Lot Number’ box, enter the LIMS number of the standard.

11.6. In the ‘Entry Value’ box, enter the measurement obtained from the volume needed to titrate the sample multiplied by 100.

11.7. In the ‘Entry Description’ box, check the LIMS numbers for the current Hardness Buffer, EDTA, and pillow packet reagent for accuracy.

11.8. When the save button is clicked, the screen will move to the next entry. At this point, all fields must be verified to ensure that accurate LIMS numbers have been entered.

11.9. No comment is needed when entering the standard.

11.10. Entry of a Facility sample or Lab Water sample.

11.10.1. For data entry of a sample, select the most recent entry with the ‘Sub_Category’ of “Sample Hardness”.

11.10.2. In the Lot Number field, enter the LIMS number of the sample. For DI Water, Well Water, and Facility samples a Lot number will not be entered.

11.10.3. For samples, the ‘Batch Number’ box is filled in with the date that the sample or dilution water was made. If it is organism water or facility water, the ‘Batch Number’ is the day it arrived.

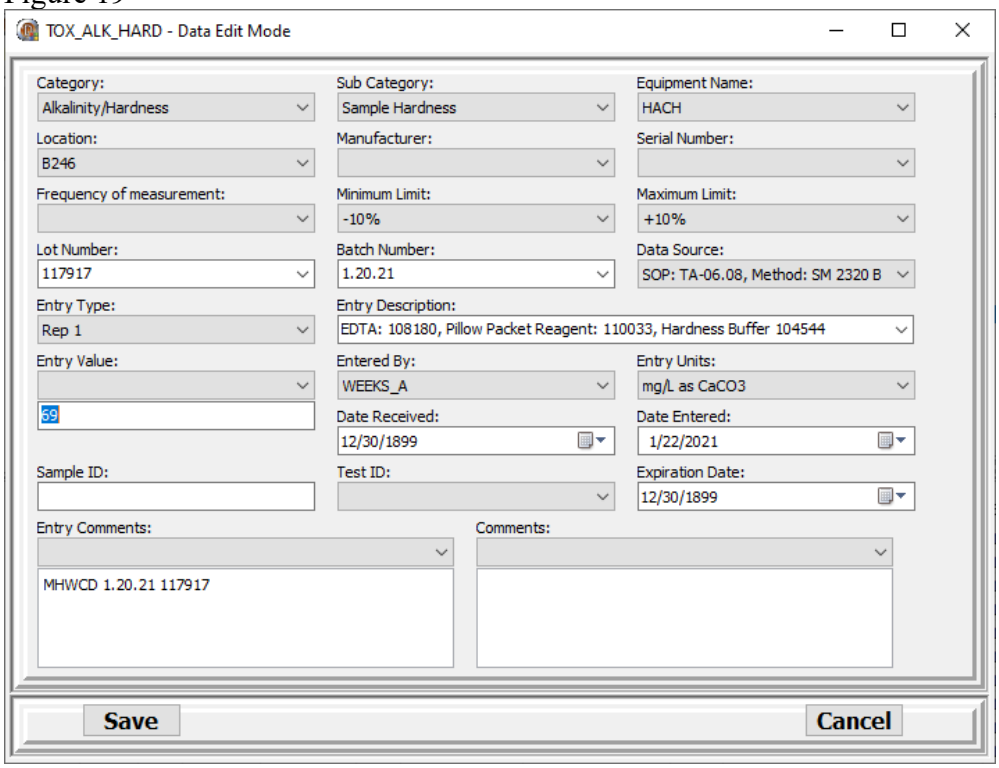
11.10.4. The ‘Entry Value’ box should be filled out with the measurement obtained from the volume needed to titrate the sample multiplied by 100.

11.10.5. For the ‘Entry Comments’, the following information should be entered: Facility/sample type, Batch number. Refer to Figure 19 for example. (Note: Make sure to pay attention to the Entry Type field as it will change after every entry.)



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11.11. Figure 19




## 12. DATA ARCHIVAL

12.1. Use a black, waterproof pen for all bench sheets and logbooks.

12.2. To correct raw data entries, place a single line through the incorrect or illegible entry. Write the corrected entry near the error, initial and date the correction. Do not overwrite entries. To edit an existing log entry: click ‘edit entry’, select the entry you want to correct, correct the entry, and enter the current date and analyst’s initials to document the correction.

12.3. The corrected entry is written as near its appropriate space as possible or else in the comment box on the appropriate bench sheet.

12.4. If the correction requires an explanation, write a comment and reference the error. Initial and date the explanation. To edit an existing log entry: click ‘edit entry’, select the entry you want to correct, correct the entry, and enter the current date and analyst’s initials to document the correction.

12.5. Use sequential alphabetical annotation to identify errors and corresponding comments (use A for first error and use A for corresponding explanatory comment; use B for second error, etc.).

## 13. QUALITY CONTROL

13.1. For Quality Control, all entries should be verified before submitting. If changes need to be made, use the comment box to note the correct measurement/value with the date and initials of the analyst making the correction.


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## 14. SAFETY/HAZARDOUS WASTE MANAGEMENT

14.1. Proper laboratory protection, including lab hood or ventilation system, lab coat, gloves, and safety glasses, is required when working with chemicals and unprocessed samples.

14.2. Refer to DEP Laboratory Quality Manual

14.3. Refer to DEP Laboratory Health and Safety Manual

14.4. Read MSDS information for reagent handling and disposal.

## 15. REFERENCES

15.1. DEP SOP TA-06.08, *Measuring Total Alkalinity and Hardness*

15.2. DEP SOP TA-06.13, *Thermometer Accuracy Check and Use*

15.3. DEP SOP TA-06.22, *Measuring Total Residual Chlorine using the Hach Pocket Colorimeter II Test Kit*

15.4. DEP SOP TA-06.43, *Calibration and Use of Fisherbrand accumet AB315 pH/mV Meter*

15.5. DEP SOP TA-06.25, *Calibration and Use of Mettler Toledo SevenMulti for Measuring Conductivity, Salinity and TDS*

15.6. DEP SOP TA-06.33, *Measuring Ammonia using Hach Ammonia Nitrogen Test Kits for Freshwater and Saltwater Samples*

15.7. DEP SOP TA-06.36, *Calibration and Use of the Fisherbrand Traceable Bench Conductivity Meter for Conductivity and Salinity*

15.8. DEP SOP TA-06.35, *Measuring Total Ammonia using the Hach Ammonia Nitrogen Pocket Colorimeter II Test Kit*

15.9. DEP SOP TA-06.44, *YSI MultiLab 4010-1 Meter Calibration and YSI IDS ProOBOD DO Probe Maintenance*

15.10. *DEP Laboratory Quality Manual* https://floridadep.gov/dear/florida-dep-laboratory/content/dep-laboratory-quality-assurance-manual-and-sops

15.11. *DEP Laboratory Health and Safety Plan* health-safety-manual (floridadep.net)



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## Appendix of Changes

07/06/2022 Edited grammar, changed figure numbers to be in order, added hyperlinks to DEP manuals, and made images smaller.

07/11/2023 Edited grammar and hyperlinks. Edited for clarity, additional instruction, and accuracy.



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