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STANDARD OPERATING PROCEDURE
STAN MAYFIELD BIOREFINERY PILOT PLANT

TITLE: Conductivity Measurement

AUTHOR: Ismael U. Nieves **DATE: February 21st, 2012**

APPROVALS: Process Change Committee **DATE:**

A. Scope

This procedure describes how to calibrate a conductivity probe and take a measurement.

B. Safety and Training Requirements

Refer to UF lab safety policies and review the Material Safety Data Sheets (MSDS) for each material listed in section D below before starting any process work.

Review the location of fire extinguishers, fire blankets, safety showers, spill cleanup equipment and protective gear before beginning any process work.

During operations in the laboratory, the following safety gear will be utilized at all times:

- Lab Coat
- Safety Goggles
- Protective Gloves (nitrile, neoprene)

Avoid inhalation of vapors and wear nitrile or neoprene rubber gloves. Contain spills by using chemical spill kits.

C. Related Documents and SOPs

1. Sampling SOP-0511
2. Denver Instrument 200 Series Meters Operating Manual (200 Series Meters)
3. MSDS Binder

D. Preparation/Materials/Equipment

1. Denver Instrument Model 220 pH/conductivity meter and probe.
2. Squirt bottle filled with nanopure water.
3. Liquid waste container (beaker)
4. Potassium chloride conductivity standard (4,500 µS/cm at 25 °C)

5. 50 mL disposable conical tube
6. Conical tube holder

E. Detailed Procedure

1. Make sure the conductivity probe is connected to the meter as indicated by the Denver Instrument 200 Series Meters Operating Manual.
2. If the sample is frozen, thaw out at room temperature.
3. Calibrate the conductivity probe.
    a. Pour ~30 mL of the potassium chloride conductivity standard into a 50 mL disposable conical tube and place the conical tube in the conical tube holder.
    b. Submerge the electrode in the standard solution, making sure that the hole in the probe is covered by the solution.
    c. Press “Standardize”.
    d. Select “Conductivity”.
    e. Select “Enter a standard”
    f. Enter the value of the standard taking into account the variation due to temperature. To calculate this value, follow these steps;
        i. 25 °C - T (temperature of the solution – given by the meter).
        ii. Multiply value from step E.3.f.i by 0.019.
        iii. Multiply value from step E.3.f.ii by 4500.
        iv. Subtract the value from step E.3.f.iii from 4500 and enter this value into the meter.
    g. After the meter goes through the 30 second equilibration period, the conductivity should be reading 4500 +/- 5 µS/cm. If not, repeat steps E.3.b through E.3.f.
    h. Rinse the electrode using nanopure water.
4. Place at least 30 mL of the sample in a 50 mL conical tube and place the conical tube in the conical tube holder.
5. Submerge the electrode in the solution, making sure that the hole in the probe is covered.
6. Record the conductivity after it has equilibrated.
7. Rinse the conductivity probe using nanopure water.

F. Data Archival and Analysis

Record all measurements in the laboratory notebook including the date, time, vessel, and batch number of the sample.