



TEXAS STREAM TEAM

STANDARD CORE SALINITY FIELD GUIDE – MONITORING PROCEDURES

This Field Guide is for monitoring salt or brackish waters primarily in coastal areas with a refractometer.

Equipment Needed

- Standard Core Kit (with unexpired reagents)
- Sample Bucket
- Deionized (DI) Water or salinity calibration solution of known concentration
- Waste Bin
- Gloves or Hand Sanitizer
- Vee Gee STX-3 Refractometer
- Transparency Tube (60 or 120 cm, optional for shallow waters)

At Site

1. Record *Field Observations* and *Comments* on Core Environmental Monitoring Form.

2. Hang thermometer out of direct sunlight, wait 2-3 minutes; record *Air Temperature* to nearest 0.5 °C.

3. Measure *Transparency* by selecting the method most applicable to your monitoring site:

A. Secchi Disc Transparency for deeper water, Lower Secchi disc until it disappears, mark depth, then raise Secchi disc until barely visible, and mark depth again. Average both depth readings and record to nearest 0.1 m.

B. Transparency Tube for shallow waters:

1. Rinse bucket and tube 2X with sample water.
2. Standing in the centroid of flow of the waterbody and downstream of the tube, dip the tube into the water facing upstream to fill it.
 - a. If centroid is not accessible, or the waterbody is unsafe to stand in, use a bucket to collect sample water and pour into the tube immediately after collection to prevent settling of suspended materials.
3. Holding the tube vertically, look down the tube to see if the disc at the bottom is visible. If disc is not visible, release water until visible and record the water level in meters on Monitoring Form.
 - a. If the tube is filled to the top and the disc is completely visible, record the measurement as > the maximum tube length (>1.2 m or >0.6 m).

4. Measure *Total Depth* by lowering Secchi disc into water until cord becomes slack, then raise until straight. Mark and record to 0.1 m.

5. Conduct bucket grab, rinse bucket 2X with sample water and discard water downstream.

6. Measure *Water Temperature* directly in the waterbody or bucket sample with thermometer for 1-1/2 minutes. Read thermometer while in water to the nearest 0.5 °C.

Dissolved Oxygen (DO) Measurement (Titration Method)

1. Rinse 2 sample bottles and caps 2X with sample water.

2. Fill each bottle with sample water and cap below sample water surface, check for air bubbles.

Fixing the DO Sample:

1. Add 8 drops Manganous Sulfate Solution to each bottle. The bottle will overflow slightly.

2. Add 8 drops Alkaline Potassium Iodide Azide. Cap both bottles, slowly invert 25 times. Allow precipitate to settle below the shoulder of the bottles, then invert 10 more times and allow settling again.

3. Add 8 drops Sulfuric Acid. Cap both bottles and slowly invert for minimum of 3 minutes or until reagent and precipitate dissolve. Sample is now "Fixed" and can be finished at home within 4 hours if weather or other conditions warrant.

Titration of the DO Sample:

1. Rinse 1 vial and cap 2X with a small volume of fixed solution from sample #1. Fill vial with fixed solution from sample #1 to 20 mL line and cap. Repeat for sample #2 and set aside.

2. Ensure pink titrator tip is in place and fill titrator with Sodium Thiosulfate – the plunger ring should be at 0.0. Expel air bubbles from titrator barrel. Place titrator into hole on vial cap. Add 1 drop at a time of titrator solution to vial and swirl to mix after each drop until the yellow-brown solution turns a pale yellow or straw color.

3. Uncap vial with titrator STILL INSERTED and keep

tip suspended above mouth of vial. Add 8 drops of Starch Indicator Solution, cap vial, and swirl to mix.

4. Continue titration drops and swirls, 1 drop at a time, until the solution becomes clear. Check against white background for any remaining color.

5. Read and record total number of units at plunger ring to nearest 0.1 mg/L under *1st titration*. Eject remainder of titrator solution into vial and dispose of vial solution in waste container.

6. Repeat titration process (Steps 1-5) with fixed solution for sample #2 and record these results under *2nd titration*. The second result must be within 0.5 mg/L of the 1st titration, if not repeat steps 1-5 for sample #1. If error limit still isn't met repeat steps 1-5 for sample #2. If repeating steps 1-5 for both samples doesn't meet the error limit, collect a new bucket grab and start over from the beginning with step #1.

7. Calculate the average of both titration results to nearest 0.1 mg/L and record under *Dissolved Oxygen*.

8. Rinse DO bottles, titration vials and caps, and titrators (including tips) 2X with DI water.

Refractometer

Calibrate with DI water or salinity calibration solution. Record 0 under *Standard Value* in the *Conductivity/Salinity* row on Monitoring Form if using DI water or the concentration of the salinity calibration solution.

Pre-Test Calibration

1. Rinse the prism and translucent cover flap 2X with DI water or salinity calibration solution.

2. Using a pipette, place a few drops of DI water or salinity calibration solution on the prism. Cover the prism with the flap and wait until the temperature equilibrates and the measurement stabilizes.

3. Hold to a light source and look through the eyepiece. Observe the scale inside the field of view.

4. Record the *Pre-Test Calibration Initial Reading*.

5. The blue line on the scale should read 0 with DI water or the salinity calibration concentration.
a. If not, use the mini screwdriver to loosen the screw on the refractometer ring. Adjust the ring until the scale reads 0 with DI water or the salinity calibration concentration.

The meter is now calibrated. Record under *Calibrated To* on Monitoring Form.

6. Rinse refractometer 2X with DI water and dry.

Measurement

1. Rinse refractometer 2X with sample water.

2. Use the pipette to cover the prism with sample water. Close the cover flap and make sure there are no air bubbles.

3. Wait until the temperature equilibrates and the measurement stabilizes.

4. Hold to a light source, look through the eyepiece, and record the *Salinity* measurement.

Post-Test Calibration

1. Rinse the prism and translucent cover flap 2X with DI water or salinity calibration solution.

2. Using a pipette, place a few drops of DI water or salinity calibration solution on the prism. Cover the prism with the flap and wait until the temperature equilibrates and the measurement stabilizes.

3. Hold to a light source and look through the eyepiece. Observe the scale inside the field of view.

4. Record the *Post-Test Calibration Initial Reading*. The difference between the *Calibrated To* value and the *Post-Test Calibration Initial Reading* should meet the error limit of ± 1 ppt.

pH

Measurement

1. Rinse 1 test tube and cap 2X with sample water.

2. Determine the type of pH viewer you are using:
A. If using the Octet Comparator (2193 and/or 2196) or the Liquid Wide Range pH Viewer (2192), fill round test tube with sample water to the 5 mL indicator line.
B. If using the Octa-Slide 2 Viewer (1101) with color bars (2196-01 and 2193-01) fill the square test tube with sample water to the 10 mL line.

3. Invert pH Wide Range Indicator bottle a few times to mix, add 10 drops to sample, cap tube, and invert 10 times.

4. Insert the tube in Color Comparator Viewer, remove cap, and hold up to white background. Estimate to nearest 0.1 s.u. and record under pH.

5. Rinse tube and cap 2X with DI water.