Refractometer

The refractometer used by SCORE volunteers is an RHS-10ATC Portable / Handheld Refractometer. This instrument is specifically designed to measure the concentration of dissolved salts in water (salinity) by applying the principle of light refraction. Light refraction is the "bending" effect that liquid has on light passing through it. As the concentration of dissolved salts increases, the "bending" effect also increases. Using carefully aligned prisms and mirrors, the refractometer measures the refracted angle of light as it passes through a sample of water. This refracted angle equates to a salinity concentration in terms of grams of salt per kilogram of water (g/kg), which is equivalent to parts salt per thousand parts water (ppt).

Before measuring the salt content of a water sample, the refractometer must be calibrated for accuracy using distilled water. Distilled water contains no salts and is used to set the refractometer to a zero reading.

Procedure

Calibration

1. Make sure that you are holding the refractometer horizontally, and open the daylight plate to expose the main prism.
2. Using a plastic pipette, place two drops of distilled water on the prism.
3. Close the daylight plate and press it lightly so that the water spreads across the entire surface of the prism without any air bubbles or dry spots. Allow the sample to remain on the prism for 30 seconds.
4. Look through the eyepiece to see a circular field with graduations on either side. The upper portion should be blue and the lower portion white. If the field is not in focus, twist the eyepiece until the graduations are clearly distinguishable. The boundary between the blue and white portions should fall on the zero mark of the graduations. If not, turn the calibration screw on top of the refractometer until the boundary between the colors reaches the zero mark.
5. After calibrating the refractometer, open the daylight plate and pat dry the main prism. This will prevent your sample from becoming diluted with distilled water.

Sample Measurement

1. Make sure that you are holding the refractometer horizontally, and open the daylight plate to expose the main prism.
2. Using a plastic pipette, collect a water sample and place two drops on the prism.
3. Close the daylight plate and press it lightly so that the sample spreads across the entire surface of the prism without any air bubbles or dry spots. Allow the sample to remain on the prism for 30 seconds.
4. Look through the eyepiece to view the parts per thousand (ppt) salinity scale (on the right), which goes from 0 to 100. Record the salinity indicated by the boundary between the blue and white portions in the refractometer field.
5. Rinse the main prism with distilled water and pat dry before putting away.

Field Notes

- Always aim the front end of the refractometer in the direction of a bright light when looking through the eyepiece.
- Avoid dropping or jolting the refractometer because this can cause misalignment of the prisms and mirrors contained within.
- DO NOT IMMERSE REFRACTOMETER IN WATER.