

SOP #1001.3 Measurement of turbidity in natural waters by nephelometry (Standard Methods 214A)**1. Summary of Method**

- a. A room temperature, thoroughly mixed sample is placed in a Hach 2100p or 2100q turbidimeter.

2. Equipment and Supplies

- a. Hach 2100P or 2100Q turbidimeter
- b. Blank
- c. 20 ntu standard
- d. 10 ntu standard
- e. Glass cleaner
- f. Gloves
- g. DI water squirt bottle
- h. KIM wipes
- i. Data forms

3. Reagents and Standards

- a. Blank cuvette containing deionized water filtered through a 0.22 um membrane filter (filtered water supplied by FWRI)
- b. 10 ntu standard: supplied with 2100Q turbidimeter
- c. 20 ntu standard: supplied with 2100Q turbidimeter

4. Sample Collection

- a. Water samples are collected in the field using 1 liter wide-mouth plastic bottles. These bottles are pre-cleaned with 10% HCl and 3-4 rinses of DI water.
- b. At each collection site, lower the bottle below the water line and fill and decant 2-3 times. Then fill the bottle almost completely full (leave enough air space to allow for shaking and mixing prior to filtration), cap with the lid and place on ice.

5. Sample Handling and Preservation

- a. Preservation by refrigeration to minimize microbial decomposition of solids

6. Sample Analysis

**** NOTE:** Hold glass cuvettes only by their caps.

**** NOTE: Do NOT shake samples.**

- a. Turn on Hach 2100P or 2100Q turbidimeter 15 minutes prior to sample reading to allow the machine to warm up

- b. Check that samples are at room temperature. When samples are transferred into glass cuvette, condensation will form and alter readings if still chilled.
- c. Clean the outside surface of the 10 ntu std, 20 ntu std, and blank cuvette with the glass cleaner. If necessary, spread a very thin film of lubricant oil on the outside of the cuvette and wipe off any excess with a kimwipe. Check that there aren't any smudges, fingerprints, or cracks are in the glass cuvette before reading.
- d. Invert 10 ntu std 25 times to assure thorough mixing. Insert the cuvette in the sample holder of the turbidimeter and wait a slow 8 count. Press "verify calibration" in bottom left corner. Press read. If calibration is successful within range, continue with analysis.
- e. Invert cleaned 20 ntu std 25 times. Insert the cuvette in the sample holder of the turbidimeter. After slow 8 count press read 5 times in a row and record readout each time. Standard range from 19.6 -20.2 ntu is acceptable.
- f. Insert the blank cuvette (DO NOT SHAKE OR INVERT DI) in the sample holder of the turbidimeter. After slow 8 count press read 5 times in a row and record readout each time.
- g. Invert sample bottle 25 times to insure thorough mixing. **DO NOT SHAKE SAMPLE**. Shaking the sample will create many air bubbles in the sample water which will alter turbidity readings.
- h. Add a small amount to "sample" cuvette. Rinse inside of cuvette thoroughly then decant into waste container.
- i. Invert sample bottle again 3-4 times and pour into sample cuvette. Fill cuvette to white line.
- j. With cap tightly sealed, invert sample cuvette 3-4 times.
- k. Clean the outside surface of the sample cuvette with the glass cleaner. If necessary, spread a very thin film of lubricant oil on the outside of the cuvette and wipe off any excess with a kimwipe. Check that there aren't any smudges, fingerprints, cracks or water drops on the glass cuvette.
- l. Place sample cuvette into turbidimeter and close lid.
- m. Wait a slow 8 count then, press read 5 times in a row and record each readout
- n. Repeat steps g-m for the remainder of the samples
- o. ****After every 15 samples and the conclusion of all samples, read 20 ntu standard and filtered DI blank by repeating steps d and e.****

7. Clean Up

- a. Rinse out the sample cuvette with DI and leave wet inside and tightly capped.
- b. Replace blank and standards in their holding locations. Do not empty blank cuvette.
- c. Turn off and cover the turbidimeter.