



## Turbidity in potable water

Turbidity measurements are frequently used as an indicator of microbiological contamination and of filtering efficacy in waters. The Thermo Scientific™ Orion™ AQ301 Turbidity Meter quickly and simply determines turbidity in potable water samples. The measurements are comparable with results from other turbidity meters.

### Materials

#### Equipment

Orion AQ3010 Turbidity Meter; Orion AC3V25 Turbidity Vials

#### Solutions

Orion AC301S Turbidity Standards; turbidity-free water (TFW), e.g., by filtration through 0.1  $\mu\text{m}$  filter or equivalent water.

### Method

#### Meter performance check/calibration verification

Note: the Orion AC301S Orion Turbidity styrene divinylbenzene (SDVB) polymer standards never need mixing. Do not shake the standards as this will introduce bubbles and cause them to read inaccurately until the bubbles dissipate. Check meter accuracy by reading one or more turbidity standards (included with the meter) at the level of interest. For example, read the zero (0.02) and the 1 NTU standard. The zero should read  $<0.1$  NTU and the 1 NTU standard should read within  $\pm 10\%$ , e.g., 0.9 – 1.1 NTU.

If the meter performance check fails, take corrective actions as follows: 1) wipe the vial carefully with a lint-free wipe to remove all fingerprints and liquid drips from the exterior, handle the vial by the cap only, and remeasure; 2) tap the vial gently three times and let the vial sit for 60 seconds to allow for bubbles to release, then remeasure; 3) using a clean vial (which reads  $<0.1$  NTU when filled with TFW), pour a fresh portion of turbidity standard into the clean vial, wipe carefully, and measure.

#### Sample vial (cuvette) storage, soaking, and rinsing

Store vials filled with TFW. Immediately after use, clean sample vials with laboratory detergent and rinse multiple times with TFW. Note: standards may be stored in supplied glass sample vials until the standard reading is no longer in specification. See Meter Performance Check section for corrective actions when a standard reads out of specification.

#### Sample storage and preparation

Analyze as soon as possible after collection. If necessary, store the samples in a cool dark location for not longer than 24 hours. Allow the samples to warm to room temperature before measurement. Mix the sample well, but do not introduce bubbles by shaking the sample. Use the sample to rinse a clean sample vial twice. Mix the sample again and fill the rinsed vial.

## Calibration

The meter is shipped precalibrated. The meter performance is very stable and does not require frequent calibration. If a standard reading is not within criteria, take all necessary corrective actions (as described in the Meter Performance Check section) to improve meter readings. If corrective actions fail and recalibration is necessary, perform the recalibration only on the points that failed and do so with fresh portions of standard poured into clean vials. Ensure that all fingerprints and liquid drips have been removed from the exterior of the vial with a lint-free wipe before using. Handle vials by the cap only.

## Analysis

Gently invert the filled sample vial a few times to mix well the sample without introducing bubbles. Wipe the sample vial to remove all traces of liquids and fingerprints, place into meter, and press the measure key. Record the reading. Press the measure key to take duplicate measurement(s). Continue until readings stabilize and results agree, for example, within 5% or +/- 0.02 NTU, whichever is higher.

## Quality control (QC)

Recommended QC procedures include: calibration verification, turbidity-free water analysis (optional), and sample duplicates.

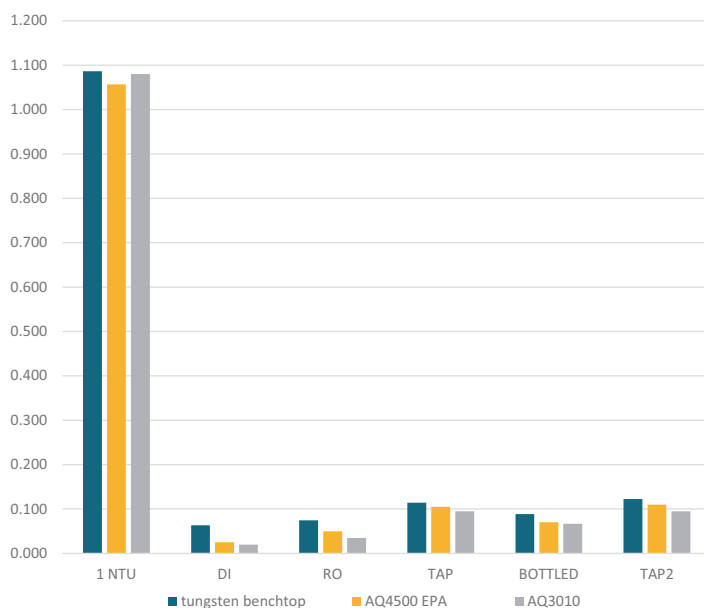
|         | Tungsten benchtop | AQ4500 EPA | AQ3010 |
|---------|-------------------|------------|--------|
| 1 NTU   | 1.087             | 1.06       | 1.08   |
| DI      | 0.064             | 0.03       | 0.02   |
| RO      | 0.075             | 0.05       | 0.04   |
| Tap     | 0.115             | 0.11       | 0.10   |
| Bottled | 0.089             | 0.07       | 0.07   |
| Tap 2   | 0.123             | 0.11       | 0.10   |

## Notes for improved accuracy of low-level samples

If improved accuracy is desired, pay close attention to 1) the cleanliness of the sample vials; 2) the quality of the TFW; 3) the handling of the standards and samples; 4) use of matching vials; 5) storing clean vials filled with TFW; 6) use vials free of scratches or other imperfections. For improved low-level accuracy, ensure that a clean vial filled with TFW reads < 0.1 NTU before using that vial to test potable water. If a clean vial does not read <0.1 NTU, discard it or set it aside for further cleaning. If no clean vials read <0.1 NTU, the TFW may need degassing or a cleaner source of TFW may be required. See ASTM D6855 Test Method for Determination of Turbidity Below 5 NTU in Static Mode for more information about low level turbidity readings.

## Results

Various pure and potable waters were tested for turbidity on different meters. The AQ3010 results agree with other meters within 0.04 NTU or better.



Turbidity of Potable Waters

## References

1. ISO 7027, Water quality – Determination of turbidity, the International Organization for Standardization, 1999. iso.org
2. ASTM D 6855, Test Method for Determination of Turbidity Below 5 NTU in Static Mode, 2003. astm.org

This product is intended for General Laboratory Use. It is the customer's responsibility to ensure that the performance of the product is suitable for customers' specific use or application.

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