NORTH CAROLINA WASTEWATER/GROUNDWATER LABORATORY CERTIFICATION APPROVED PROCEDURES FOR THE ANALYSIS OF SPECIFIC CONDUCTANCE (CONDUCTIVITY)

This document provides an approved procedure for the analysis of Specific Conductance per 15A NCAC 2H .0805 (a) (6) (F) and (g) (3). The procedures in this document, in addition to all requirements of the EPA approved method found in 40 CFR Part 136.3, must be met.

Holding Time:

- Samples must be analyzed within 28 days of collection (40 CFR Part 136 Table II).
- Samples must be stored above freezing and ≤6°C, if not analyzed immediately.

General Information:

- In water analysis, the measurement is expressed in µmhos/cm. Some meters display units in µS/cm. (1µmho/cm = 1µS/cm)
- Conductivity samples must not be diluted.
- When performing analyses away from the certified laboratory's primary location, a post analysis calibration verification must be analyzed at the end of the run. It is recommended that a mid-day calibration verification be performed when samples are analyzed over an extended period of time. The value obtained for the post analysis calibration verification check standard must read within 10% of the true value of the post analysis calibration verification check standard. If the obtained value is outside of the ±10% range, corrective action must be taken.
- The Automatic Temperature Compensator (ATC) must be verified annually (i.e., 12 months) at two temperatures by analyzing a standard or sample at 25°C (the temperature that conductivity values are compensated to) and a temperature(s) that brackets the temperature ranges of the environmental samples routinely analyzed. This may require the analysis of a third temperature reading that is > 25°C (see #3 below). The manner in which the ATC is verified may depend upon the meter's capabilities and the manufacturer's instructions. The following is one option.

  1. Pour an adequate amount of conductivity standard or sample into a beaker or other container and analyze at 25°C. Document the temperature and conductivity value.
  2. Lower the temperature of the standard or sample (e.g., by placing the container in a refrigerator or ice chest) to less than the lowest anticipated sample temperature and analyze. Document the temperature and conductivity value.
  3. If samples greater than 25°C are to be analyzed, perform the following additional step: Raise the temperature above 25°C to greater than the highest anticipated sample temperature (e.g., by placing the container in a hot water bath) and analyze. Document the temperature and conductivity value.

  As the temperature increases or decreases, the value of the conductivity standard or sample must be within ±10% of the true value of the standard or ±10% of the value of the sample at 25°C. If not, corrective action must be taken.

  Anticipated temperatures can be obtained from a review of the Discharge Monitoring Reports (DMRs) from the peak summer and winter months. Historical data should provide a reasonably accurate estimation of ranges that will bracket the expected sample temperatures.

  Other certified laboratories may provide assistance in meeting this ATC verification requirement.

Standards:

Potassium Chloride (KCl) Conductivity standards may be purchased in the ranges desired, or they may be prepared according to Table 2510:I of Standard Methods, 2510 A - 1997. A portion of the standard should not be used for more than one calibration. Discard any used standard portions.

Calibration:

1. Instruments are to be calibrated according to the manufacturer's calibration procedure prior to analysis of samples each day compliance monitoring is performed. For most meters, this is a one-point calibration.

2. Thoroughly rinse cell with one or more portions of sample.

3. Analyze and document a calibration verification check standard prior to environmental sample analysis. It is recommended that this standard value bracket (may be higher or lower than the calibration standard, as applicable) the expected range of sample values measured.

4. The value obtained for the calibration verification check standard must read within 10% of the true value of the calibration verification check standard. If the obtained value is outside of the ±10% range, corrective action must be taken.

Documentation:

The following must be documented in indelible ink whenever sample analysis is performed.

1. Date and time of sample collection.
2. Date and time of sample analysis to verify the 28 day holding time is met. Alternatively, one time may be documented for collection and analysis with the notation that samples are measured *in situ* or immediately at the sample site.
3. Sample site including facility name and location, ID, etc.
4. Collector's/analyst's name or initials.
5. Meter calibration and meter calibration time(s).
6. True value of the standard used for calibration.
7. True value of the calibration verification check standard.
8. Value obtained and time analyzed for the check standard (verification of ± 10% recovery).
9. True value and value obtained for the post analysis calibration verification(s), where applicable.
10. All data must be reported in µmhos/cm at 25ºC or corrected to 25ºC.
11. Traceability for chemicals, reagents, standards and consumables.
12. Instrument identification.
13. Parameter analyzed.
14. Data qualifiers, when necessary.
15. Equipment maintenance (recommended).

Refer to *Quality Assurance Policies for Field Laboratories* (at http://portal.ncdenr.org/web/wq/lab/cert/field/policy) for additional quality assurance and quality control requirements.

Ref: Standard Methods 2510 B – 1997
EPA Method 120.1