*Name of Facility*

Standard Operating Procedure for

the analysis of Compliance Sample Temperature

Method: SM 2550 B-2010

Effective Date:

Supervisor Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_

Supervisor Name (print):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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*Blue text is replaceable instructional language to be customized for your facility.*

1. Summary of Method
   1. The temperature of a compliance sample is measured with a calibrated or verified temperature-measuring device. This SOP is not applicable to temperature measurement of laboratory equipment.
   2. *State what type of samples are analyzed, e.g., wastewater effluent, ground water monitoring well, etc.*
   3. *State if the sample is analyzed in stream or must be collected in a container due to low flow, etc.*
   4. *State what units the result is read/reported in e.g., Degrees Celsius*
   5. *State your permit limit if applicable*
2. Definitions
   1. National Institute of Standards and Technology (NIST) – A unit of the Commerce Department that promotes and maintains measurement standards.
   2. Reference Temperature-Measuring Device – An NIST traceable temperature-measuring device used only to verify the calibration of other temperature-measuring devices (i.e., limited use only).
   3. Compliance Temperature-Measuring Device – the temperature-measuring device that is used to generate compliance data.
   4. Calibration – Procedure performed by NIST, the manufacturer or any ISO 17025 compliant vendor which results in the issuance of a new certificate of traceability to NIST standards.

* 1. Verification – Comparison of a temperature-measuring device reading to a Reference Temperature-Measuring Device reading.

1. Safety and Waste Handling
   1. *Items that would be included in this section are things such as:* 
      * *Precautionary measures (list here and at the critical steps in the procedure)*
      * *Personal protective equipment (e.g., gloves, eye protection)*
      * *Storage and disposal of samples*
2. Apparatus and Equipment
   1. Compliance Temperature-Measuring Device: *List the compliance thermometer or instrument with make and model and its gradation markings or digital resolution (e.g., 0.1*°C)
   2. *(if needed)* Reference Temperature-Measuring Device: *list here*
3. Interferences
   1. N/A
4. Sample Collection, Preservation and Holding Time
   1. *If there are special conditions that don’t allow immediate analysis such as hazardous areas, etc., detail those. If samples are collected in containers they must be glass, fluoropolymer or polyethylene containers.*
   2. There is no preservation requirement for Temperature.
   3. Temperature is recommended to be analyzed immediately but may be analyzed within 15 minutes.
5. Verification and Calibration
   1. Verification: The Compliance Temperature-Measuring Devicemust be verified initially, if it does not have a valid NIST traceable certificate, and every 12 months thereafter against a Reference Temperature-Measuring Device. The process must be documented and kept on file for 5 years. *If the verification is performed by another laboratory, the documentation must be received and retained for 5 years.*
      1. *State whether the verification is performed by your laboratory or another laboratory. Regardless of who does it, the following items are required, so it is recommended the next sections remain in the SOP*
      2. This laboratory must have access to the NIST traceable certificate of the Reference Temperature-Measuring Device to demonstrate its accuracy of ± 0.5 °C.
      3. The temperature of the Compliance Temperature-Measuring Device is checked against the Reference Temperature-Measuring Device at two temperatures that bracket the expected range of normal use.
         1. The temperature readings and serial numbers of both temperature-measuring devices are documented.
      4. The readings of the Compliance Temperature-Measuring Devicein use must be less than or equal to 0.5 °C from the reading of the Reference Temperature-Measuring Device, or the temperature-measuring device cannot be used to generate compliance sample results.
   2. [*use section 7.2 if your lab has the reference temperature-measuring device in house, otherwise, delete 7.2 and its subsections]* The Reference Temperature-Measuring Device must be recalibrated in accordance with the manufacturer’s recalibration date (not to exceed five years). If no recalibration date is given, it must be recalibrated, at a minimum, every 5 years.
      1. Calibrations are performed by (state who performs this) and results in the issuance of a new NIST certificate of traceability.
      2. The new certificate must state that the Reference Temperature-Measuring Device has an accuracy of at least ± 0.5°C.

* + 1. Recalibrate the Reference Temperature-Measuring Device sooner if it has been exposed to temperatures beyond the manufacturer’s recommended range of use.

1. Procedure
   1. *State your normal procedure here with items such as:* *where/how you sample,*

* 1. *the proper immersion depth for the thermometer/meter,*
  2. *how long the temperature is allowed to stabilize*
  3. No temperature correction is applied to the reading on the Compliance Temperature-Measuring Device.

1. 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. *Only one date and time is needed if the benchsheet clearly documents that the samples are analyzed in situ/in stream*
  3. Collector’s/analyst’s name or initials.
  4. Facility name, sample site (ID or location) and permit number
  5. Parameter analyzed
  6. Method Reference (SM 2550 B-2010)
  7. Compliance Temperature-Measuring Device instrument identification (*serial number is preferred)*
  8. Sample temperature measurement in *°C or °F (use permit specified units and delete other)*
  9. Data qualifiers, when necessary.
  10. *Equipment maintenance (this is recommended, but not required)*

1. Reporting
   1. *State how the data is recorded on the benchsheet and reported (i.e., whole numbers or 10th of a degree). Unless greater precision is required by the permit or data receiving agency, all temperatures reported for compliance monitoring should be reported in whole numbers as recommended by the Precision in Discharge Monitoring Reports document.*
   2. *State who is transcribing the data to the DMR and whether anyone peer reviews (checks) it. Peer review is recommended, but if that is not possible, it is recommended that person recheck their own transcription for errors after a certain amount of time has passed.*
2. Preventative Maintenance
   1. *State if a maintenance log or record is maintained*
   2. *State how the temperature-measuring devices are stored*
3. Troubleshooting and Corrective Action
   1. *State what will be done if a Compliance Temperature-Measuring Device does not pass the annual verification*
4. Employee Training

The following employee training must be documented and kept on file.

* 1. *Include education, training, experience and/or demonstrated skills required for the position*
  2. Employee must have read this SOP *– may also include reading the Approved Procedure for the Analysis of Temperature.*
  3. *Employee must demonstrate proficiency (e.g., side-by-side comparison with trained analyst, etc.) before analyzing compliance samples for reporting.*

1. References
   1. Standard Methods, 2550 B-*2010*.
   2. North Carolina Wastewater/Groundwater Laboratory Certification Approved Procedure for the Analysis of Temperature, *Revision 06/2019*.
   3. 15A NCAC 02H .0800
2. Revision History

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| Type: Review or Revision | Date | Summary of Changes Made if Revision |
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