

SOP-C-131

Preparation of Soil Samples

Revision 4

Approval:


Laboratory Manager

4-13-23
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Texas Institute for Applied Environmental Research

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- i. **Identification of the method**
 - a. 1B from Soil Survey Laboratory Methods Manual
- ii. **Applicable matrix or matrices**
 - a. Soils and other solids (not TNI accredited)
- iii. **Limits of detection and quantitation**
 - a. NA
- iv. **Scope and application, including parameters to be analyzed**
 - a. The purpose of the procedure is to provide a method for the preparation of soil samples for analysis.
- v. **Summary of the method**
 - a. Physical grinding and sieving
- vi. **Definitions**
 - a. Air drying – To place a sample in an open container and leave for a period of time until dry; as opposed to oven drying.
- vii. **Interferences**
 - a. Humidity when air drying
 - b. Mixing of samples in grinder and/or sieve
 - c. Size of sample
- viii. **Safety**
 - a. All aspects of this procedure shall comply with QAM-S-101, "Laboratory Safety."
 - b. The analyst should read the SDS for any chemicals before use.
 - c. The analyst should wear protective equipment such as eyewear, lab coat, and gloves when needed.
 - d. All waste should be placed into the proper waste receptacle and disposed of in accordance with QAM-W-101, "Disposal of Laboratory Waste."
- ix. **Equipment and supplies**
 - a. Grinder – a metal, hand-crank, assembly that clamps to a table
 - b. Sieve (US ASTM Std. No. 200 – 75 micrometers) – a circular metal pan with a fine mesh for the bottom, through which only fine particles will pass. Larger sieves may be used as needed for pre-filters prior to the introduction to the No. 200 sieve.

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- c. Aluminum pans – aluminum containers to place samples in while air-drying and after sieving.
- d. Plastic bags – Ziplock™ type or equivalent
- e. Glass marbles may facilitate grinding and may be used if they are acid washed between samples
- f. Mortars and pestles may be used if washed between samples
- x. **Reagents and standards**
 - a. Reagents: None
 - b. Standards: None
- xi. **Sample collection, preservation, shipment and storage**
 - a. Samples may be refrigerated to $>0\text{--}\leq 6^{\circ}\text{C}$ until drying may be started.
 - b. Samples are not normally collected or shipped by the lab.
- xii. **Quality control**
 - i. All aspects of this procedure comply with QAM-Q-101, “Laboratory Quality Control”.
 - ii. Duplicate samples shall be created when the samples are weighed out for extraction purposes.
 - iii. Subsamples taken from original containers shall be representative of the entire sample by mixing, stirring or otherwise homogenizing the original sample. Subsample aliquots shall be uniquely labeled with an identifier in addition to the sample number
- xiii. **Calibration and standardization**
 - a. NA
- xiv. **Procedure**
 - a. Upon sample receipt, verify that sample containers are properly sealed to avoid spillage and that excess moisture or condensation is not present on the sample container.
 - b. Samples should be stored in plastic bags. Wet samples should be processed as soon as possible to avoid biological degradation.
 - c. Sticks, leaves, organisms or other materials may be physically removed from the sample if the client does not

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wish them to be considered part of the sample. Solid and semi-solid samples dried or wet, may be stirred, shaken, milled, ground or otherwise mixed. Spatulas, spoons, and other utensils should be used to obtain representative portions from different sections of the original container prior to transfer.

d. Air drying the samples

- i. Number the aluminum pans with the sample numbers
- ii. Pour each sample into a numbered pan, spread out and let stand until dry.

e. Grinding the samples

- i. Pour a small amount of a sample, about a cupful, into the grinder or mill. Use more as appropriate. Place a waste container under the opening, where the ground sample exits the grinder, and hand or motor crank until most of the sample has gone through.
- ii. Add the rest of the sample to the grinder. Place the corresponding numbered pan under the opening and hand crank until all of the sample that has passed through.
- iii. Transfer the ground material from the pan back into the numbered plastic bag.
- iv. Repeat the previous three steps for all the samples.
- v. For small samples, a mortar and pestle may be used for grinding.
- vi. Clean equipment between samples. Grinder may be cleaned between samples by grinding a small amount of sample and discarding.

f. Sieving samples

- i. Number plastic bags with the sample numbers
- ii. Locate the No. 200 sieve which has 75 micrometer mesh.
- iii. Tap against the table to remove any previous dust particles.
- iv. Add the first sample to the sieve and place over the corresponding numbered pan.

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- v. Shake the sieve to allow the sample to pass through. If necessary, use a small beaker or equivalent to rub sample over the mesh. Use caution as the mesh may tear and is expensive.
- vi. After an appropriate amount of sample has gone through the sieve, place the unsieved sample back into the original plastic bag. Place the sieved sample into a new, clean plastic bag.
- vii. Repeat for remaining samples
- viii. Retain excess sample for possible later use.
- ix. Clean the sieve between samples by rinsing with DI water.

xv. Data analysis and calculations;

- a. NA

xvi. Method performance

- a. NA

xvii. Pollution prevention

- a. Pollution prevention: refer to QAM-W-101, "Disposal of Laboratory Waste"

xviii. Data assessment and acceptance criteria for quality control measures

- a. Data assessment and acceptance: refer to QAM-Q-101, "Laboratory Quality Control"

xix. Corrective actions for out-of-control data

- a. Corrective action: refer to QAM-Q-105, "Corrective Actions"

xx. Contingencies for handling out-of-control or unacceptable data

- a. Refer to QAM-Q-101, "Laboratory Quality Control" and QAM-Q-105, "Corrective Actions."

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xxi. Waste management

- a. Waste management: refer to QAM-W-101, "Disposal of Laboratory Waste". No hazardous waste is expected to be generated from this procedure unless from samples.

xxii. References

- a. Soil Survey Laboratory Methods Manual, U.S. Department of Agriculture, Soil Survey Investigations Report No. 42, Version 2.0, August 1992, Pg. 347, Method 1B.
- b. The National Environmental Laboratory Accreditation Conference Institute (TNI) standard, 2016.

xxiii. Any tables, diagrams, flowcharts and validation data

- a. none