# GENERAL SAMPLING PROCEDURES

See also the following Standard Operating Procedures:

###### FA 1000 and 2000 Administrative Procedures

###### FC 1000 Cleaning/Decontamination Procedures

###### FD 1000-9000 Documentation Procedures

###### FM 1000 Field Planning and Mobilization

###### FQ 1000 Field Quality Control Requirements

#### Preliminary Activities

##### Begin each sampling trip with some planning and coordination. Refer to FM 1000 for recommendations and suggestions on laboratory selection and communication, and field mobilization.

##### DEP recommends that a minimum of two people be assigned to a field team. In addition to safety concerns, the process of collecting the samples, labeling the containers and completing the field records is much easier if more than one person is present.

##### If responding to incidents involving hazardous substances, DEP recommends that four or five people be assigned to the team.

##### Equipment

##### Select appropriate equipment based on the sampling source (see FS 2000 to FS 8200), the analytes of interest and the sampling procedure.

##### If properly cleaned, sample containers may be used as collection devices or intermediate containers.

##### The equipment construction must be consistent with the analytes or analyte groups to be collected (see Tables FS 1000-1 through FS 1000-3).

##### Bring precleaned equipment to the field or use equipment that has been certified clean by the vendor or laboratory.

##### Dedicated Equipment Storage

##### Store all dedicated equipment (except dedicated pump systems or dedicated drop pipes) in a controlled environment.

##### If possible, store equipment in an area that is located away from the sampling site. If equipment other than dedicated pumps or dedicated drop pipes is stored in monitoring wells, suspend the equipment above the formation water.

##### Securely seal the monitoring well in order to prevent tampering between sampling events.

##### Decontaminate all equipment (except dedicated pumps or drop pipes) before use according to the applicable procedures in FC 1000.

##### Sample Containers

##### The analyses to be performed on the sample determine the construction of sample containers.

##### Inspect all containers and lids for flaws (cracks, chips, etc.) before use. Do not use any container with visible defects or discoloration.

#### Contamination Prevention

##### Contamination Prevention

##### Take special effort to prevent cross contamination and contamination of the environment when collecting samples. Protect equipment, sample containers and supplies from accidental contamination.

##### Do not insert pump tubing, measurement probes, other implements, fingers, etc. into sample containers or into samples that have been collected for laboratory analysis.

##### If it is necessary to insert an item into the container or sample, ensure that the item is adequately decontaminated for the analytes of interest to be analyzed in the sample.

##### If possible, collect samples from the least contaminated sampling location (or background sampling location) to the most contaminated sampling location.

##### Collect the ambient or background samples first and store them in separate ice chests or shipping containers.

##### Collect samples in flowing water from downstream to upstream.

##### Do not store or ship highly contaminated samples (concentrated wastes, free product, etc.) or samples suspected of containing high concentrations of contaminants in the same ice chest or shipping container with other environmental samples.

##### Isolate these sample containers by sealing them in separate, untreated plastic bags immediately after collecting, preserving, labeling, etc.

##### Use a clean, untreated plastic bag to line the ice chest or shipping container.

##### Segregate reagents such as preservation acids during storage and transport as necessary to prevent cross-contamination of samples or other reagents.

##### Composite Samples

##### Do not collect composite samples unless required by permit or DEP program.

##### If compositing is required, use the following procedure:

##### Select sampling points from which to collect each aliquot.

##### Using the appropriate sampling technique, collect equal aliquots (same sample size) from each location and place in a properly cleaned container.

##### Record the approximate amount of each aliquot (volume or weight).

##### Add preservative(s), if required.

##### Label container and make appropriate field notes (see FD 1000-9000).

##### Notify the laboratory that the sample is a composite sample.

##### When collecting soil or sediment samples, combine the aliquots of the sample directly in the sample container with no pre-mixing. Notify the laboratory that the sample is an unmixed composite sample, and request that the laboratory thoroughly mix the sample before sample preparation or analysis.

##### When collecting water composites see FS 2000, section 1.3 or pertinent sections of other water matrix SOPs for specific details on collection.

#### Protective Gloves

##### Gloves serve a dual purpose to:

###### Protect the sample collector from potential exposure to sample constituents

###### Minimize accidental contamination of samples by the collector

##### The DEP recommends wearing protective gloves when conducting all sampling activities. They must be worn when:

###### The sample source is considered to be hazardous

###### The samples will be analyzed for trace constituents

###### The handled part of the sampling equipment comes in direct contact with the sample source.

##### Do not let gloves come into contact with the sample or with the interior or lip of the sample container.

##### Use clean, new, unpowdered and disposable gloves.

##### DEP recommends latex gloves, however, other types of gloves may be used as long as the construction materials do not contaminate the sample or if internal safety protocols require greater protection. In the case of PFAS sampling, new powderless nitrile gloves must be worn when filling and sealing the sample bottles.

##### Note that certain materials (as might be potentially present in concentrated effluent) may pass through certain glove types and be absorbed in the skin. Many vendor catalogs provide information about the permeability of different gloves and the circumstances under which the glove material might be applicable.

##### The powder in powdered gloves can contribute significant contamination and DEP does not recommend wearing powdered gloves unless it can be demonstrated that the powder does not interfere with the sample analysis.

##### If gloves are used, change:

###### After preliminary activities such as pump placement;

###### After collecting all the samples at a single sampling point;

###### If torn or damaged; or

###### Used to handle extremely dirty or highly contaminated surfaces.

##### Properly dispose of all used gloves.

#### Container and Equipment Rinsing

When collecting aqueous samples, rinse the sample collection equipment with a portion of the sample water before taking the actual sample. Sample containers do not need to be rinsed. In the case of petroleum hydrocarbons, oil & grease or containers with premeasured preservatives, the sample containers cannot be rinsed.

#### Fuel-Powered Equipment and Related Activities

##### Place all fuel-powered equipment away from, and downwind of, any site activities (e.g., purging, sampling, decontamination). If field conditions preclude such placement (i.e., the wind is from the upstream direction in a boat), place the fuel source(s) as far away as possible from the sampling activities and describe the conditions in the field notes.

##### Handle fuel (i.e., filling vehicles and equipment) prior to the sampling day. If such activities must be performed during sampling, the personnel must wear disposable gloves. Dispense all fuels, dispose of gloves downwind, and well away from the sampling activities.

##### If sampling at active gas stations, stop sample collection activities during fuel deliveries.

#### Preservation, Holding Times and Container Types

##### Preserve all samples according to the requirements specified in Tables FS 1000-4 through FS 1000-11.

##### The information listed in the above-referenced tables supersedes any preservation techniques, holding time or container type that might be discussed in individual analytical methods.

##### If samples are collected only for total phosphorus and are not for NPDES compliance, thermal preservation (ice) is not required if the sample containers are pre-preserved with acid.

##### The preservation procedures in the referenced tables specify immediate preservation. "Immediate" is defined as "within 15 minutes of sample collection." Perform all preservation on-site (in the field).

##### Preservation is not required if samples can be transported back to the laboratory within 15 minutes of collecting the sample and

##### The laboratory begins sample analysis within the 15-minute window and documents the exact time the analysis began, or

##### The laboratory adds the appropriate preservatives (including thermal preservation) within 15 minutes of sample collection and documents the exact time that the preservation was done.

##### Preserving Composite Water Samples

##### If the sample preservation requires thermal preservation (e.g., <6°C), the samples must be cooled to the specified temperature.

##### Manually collected samples to be composited must be refrigerated at a temperature equal to or less than the required temperature.

##### Automatic samplers must be able to maintain the required temperature by packed ice or refrigeration.

##### When chemical preservation is also required, begin the preservation process within 15 minutes of the last collected sample.

##### Holding Times for Automatic Samplers:

##### If the collection period is 24 hours or less, the holding time begins at the last scheduled sample collection;

##### If the collection period exceeds 24 hours, the holding time begins with the time that the first sample is collected.

##### pH Adjusted Preservation - Check the pH of pH-adjusted samples according to these frequencies:

##### During the first sampling event at a particular site, check **all** samples (e.g. each groundwater monitoring well, surface water location, or influent/effluent sampling location) that are pH-adjusted except volatile organics.

##### During subsequent visits to a particular site, check **at least one** sample per parameter group that must be pH-adjusted.

##### If samples are routinely collected from the same sample location, a pH check is not required each time samples are collected. If the frequency of sample collection at a specified location is greater than once per month (i.e., weekly or daily), check the pH of **at least one sample** per parameter group (except volatile organics) according to the following schedule:

##### Weekly sampling: 1 pH check per month

##### Daily sampling: 1 pH check per week

##### If the frequency of sample collection at a specified location is once per month, check the pH of at least one sample per parameter group (except volatile organics) quarterly.

##### If repeat samplings at the same site are performed less frequently than monthly, or if site conditions vary from sampling event to sampling event, check all the samples per section 4.1 above.

##### Thermal Preservation

##### When preservation requirements indicate cooling to a specific temperature, samples must be immersed in wet ice within 15 minutes of sample collection (see 1006, section 2 above). Frozen ice packs are not acceptable for cooling samples. Unless specified, do not freeze samples.

##### All supplies (ice, dry ice, etc.) necessary to meet a thermal preservation requirement must be onsite for immediate use.

##### Ship samples in wet ice. If samples are cooled to the required temperature before shipment, samples may be shipped with frozen ice packs if the specified temperature is maintained during shipment. The sample temperature must not exceed the specified temperature.

##### If immediate freezing is required, dry ice must be available in the field to begin the freezing process.

#### Preventive and Routine Maintenance

Preventive maintenance activities are necessary to ensure that the equipment can be used to obtain the expected results and to avoid unusable or broken equipment while in the field. Equipment is properly maintained when:

###### It functions as expected during mobilization; and

###### It is not a source of sample contamination (e.g., dust).

##### Follow the manufacturer's suggested maintenance activities and document all maintenance. At a minimum, DEP recommends the activities listed on Table FS 1000-12.

##### Maintain documentation for the following information for each piece of equipment or instrumentation. See FD 3000 also.

##### Designate the identity of specific instrumentation in the documentation with a unique description or code for each instrument unit employed. This identifier may include a manufacturer name, model number, serial number, inventory number or other unique identification.

##### Log all maintenance and repair performed for each instrument unit, including routine cleaning procedures and solution or parts replacement for instrument probes.

##### Include the calendar date for the procedures performed.

##### Record names of personnel performing the maintenance or repair tasks.

##### Describe any malfunctions necessitating repair or service.

##### Retain vendor service records for all affected instruments.

##### Record the following for rented equipment:

##### Rental date(s)

##### Equipment type and model or inventory number or other description

##### Retain the manufacturer’s operating and maintenance instructions.

#### Documentation and References

##### References: The most current version of all sampling references must be available for consultation in the field. These include:

###### DEP SOPs;

###### Internal SOPs;

###### Sampling and analysis plans; and/or

###### Quality Assurance Project Plans.

##### Documentation: Complete and sign all documentation (see FD 1000).

#### Sample Documentation and Evidentiary Custody

##### Sample Documentation

##### Document all activities related to a sampling event, including sample collection, equipment calibration, equipment cleaning and sample transport.

##### The required documentation related to each sampling or other field activity is specified in the associated SOPs; i.e., FQ 1000, FC 1000, the FS series, and the FT series.

##### The documentation requirements are also summarized in FD 1000, Field Documentation. See FD 9000 for required and optional documentation forms.

##### Legal Chain of Custody (COC)

The use of legal or evidentiary Chain-of-Custody (COC) protocols is not usually required by DEP, except for cases involving civil or criminal enforcement. Do not use these procedures for routine sampling for compliance unless evidentiary custody protocols are specifically mandated in a permit or other legal order or when required for enforcement actions.

Evidentiary sample custody protocols are used to demonstrate that the samples and/or sample containers were handled and transferred in such a manner as to eliminate possible tampering.

When a client or situation requires legal COC, use the procedures in FD 7000 to document and track all time periods associated with the physical possession and storage of sample containers, samples, and subsamples from point of origin through the final analytical result and sample disposal.

When legal or evidentiary COC is required, samples must be:

###### In the actual possession of a person who is authorized to handle the samples (e.g., sample collector, laboratory technician);

###### In the view of the same person after being in their physical possession;

###### Secured by the same person to prevent tampering; or

###### Stored in a designated secure area.

##### Control and document access to all evidentiary samples and subsamples with adequate tracking. Documentation must include records about each of the activities and situations listed below, when applicable to sample evidence, and must track the location and physical handling of all samples by all persons at all times.

##### Limit the number of individuals who physically handle the samples as much as practicable.

##### When storing samples and subsamples, place samples in locked storage (e.g., locked vehicle, locked storeroom, etc.) at all times when not in the possession or view of authorized personnel.

##### Alternatively, maintain restricted access to facilities where samples are stored. Ensure that unauthorized personnel are not able to gain access to the samples at any time.

##### Do not leave samples in unoccupied motel or hotel rooms or other areas where access cannot be controlled by the person(s) responsible for custody without first securing samples and shipping or storage containers with tamper-indicating evidence tape or custody seals. Ice chests or other storage containers used to store sample containers in hotel rooms may be sealed instead of sealing each sample container stored within.

##### Use a Chain of Custody form or other transmittal record to document sample transfers to other parties. Other records and forms may be used to document internal activities if they meet the requirements for legal chain of custody.

##### Legal COC begins when the precleaned sample containers are dispatched to the field.

##### The person who relinquishes the prepared sample kits or containers and the individual who receives the sample kits or containers must sign the COC form unless the same party provides the containers and collects the samples.

##### All parties handling the empty sample containers and samples are responsible for documenting sample custody, including relinquishing and receiving samples, except commercial common carriers.

##### Shipping Samples under Legal COC

##### Complete all relevant information on the COC transmittal form or record (see FD 7200, section 2).

##### Internal records must document the handling of the samples and shipping containers in preparation for shipment. The names of all persons who have prepared the shipment must be recorded. All time intervals associated with handling and preparation must be accounted for.

##### Place the forms in a sealed waterproof bag and place in the shipping container with the samples.

##### Seal the shipping container with tamper-proof seals (see 2.6 below) so that any tampering can be clearly seen by the individual who receives the samples.

##### Note: The common carrier does not sign COC records. However, the common carrier (when used) must be identified.

##### Delivering Samples to the Laboratory

##### All individuals who handle and relinquish the sample containers must sign the transmittal form. The legal custody responsibilities of the field operations end when the samples are relinquished to the laboratory.

##### Chain of Custody Seals: If required, affix tamper-indicating evidence tape or seals to all sample, storage and shipping container closures when transferring or shipping sample container kits or samples to another party.

##### Place the seal so that the closure cannot be opened without breaking the seal.

##### Record the time, calendar date and signatures of responsible personnel affixing and breaking all seals for each sample container and shipping container.

##### Affix new seals every time a seal is broken until continuation of evidentiary custody is no longer required.

#### Health and Safety

Implement all local, state and federal requirements relating to health and safety.

#### Hazardous Wastes

Investigators and sampling personnel should attempt to follow all local, state and federal requirements pertaining to the storage and disposal of any hazardous or investigation-derived wastes (IDW). The discussion below is not intended to describe these requirements and is provided for informational purposes only.

##### All IDW should be properly managed so that contamination is not spread into previously uncontaminated areas.

##### IDW typically includes all water, soil, drilling mud, decontamination wastes, discarded personal protective equipment (PPE), etc. from site investigations, exploratory borings, piezometer and monitoring well installation, refurbishment, and abandonment, and other investigative activities. IDW should be containerized at the time it is generated.

##### Investigators and sampling personnel should determine if the IDW must be managed as Resource Conservation and Recovery Act (RCRA) regulated hazardous waste through appropriate testing or generator knowledge. IDW that is determined to be RCRA regulated hazardous waste should be managed according to the applicable local, state and federal requirements.

##### IDW that is not a RCRA regulated hazardous waste but is contaminated above the Department’s Soil Cleanup Target Levels or the state standards and/or minimum criteria for ground water quality should be properly disposed of according to the applicable local, state and federal requirements.

##### IDW that is not contaminated or contains contaminants below the Department’s Soil Cleanup Target Levels or the state standards and/or minimum criteria for ground water quality may be disposed of onsite if the IDW will not cause a surface water violation. However, investigators and sampling personnel should first verify that all applicable regulations have been met before disposal of the IDW.

##### All containers holding IDW should be maintained in good condition:

##### Containers should be periodically inspected for damage

##### Personnel should ensure that all required labeling (DOT, RCRA, etc.) is clearly visible.

Appendix FS 1000

Tables, Figures and Forms

Table FS 1000-1 Equipment Construction Materials

Table FS 1000-2 Construction Material Selection for Equipment and Sample Containers

Table FS 1000-3 Equipment Use and Construction

Table FS 1000-4 40 CFR Part 136 Table II: Required Containers, Preservation Techniques, and Holding Times (Water/Wastewater Samples)

Table FS 1000-5 Approved Water and Wastewater Procedures, Containers, Preservation and Holding Times for Analytes not found in 40 CFR Part 136

Table FS 1000-6 Recommended Sample Containers, Sample Volumes, Preservation Techniques and Holding Times for Residuals, Soil and Sediment Samples.

Table FS 1000-7 Sample Handling, Preservation and Holding Time Table for SW 846 Method 5035

Table FS 1000-8 Preservation Methods and Holding Times for Drinking Water Samples that Differ from 40 CFR Part 136, Table II

Table FS 1000-9 Containers, Preservation and Holding Times for Biosolids Samples and Protozoans

Table FS 1000-10 Container Materials, Preservation, and Holding Times for Fish and Shellfish

Table FS 1000-11 Holding Times for SPLP or TCLP Extraction, Sample Preparation and Determinative Analysis

Table FS 1000-12 Preventive Maintenance Tasks

| **Construction Material**[[1]](#endnote-1) | Acceptable Analyte Group[[2]](#endnote-2) | Precautions |
| --- | --- | --- |
| 316 Stainless Steel (metals) | All analyte groups.  Recommended for inorganic nonmetallics, metals, volatile organics, extractable organics, and PFAS. | Do not use if weathered, corroded or pitted.[[3]](#endnote-3) |
| 300-Series Stainless Steel (304, 303, 302) (metals) | Suitable for all analyte groups (if used, check for corrosion before use).  Recommended for inorganic nonmetallics, metals, volatile organics, extractable organics, and PFAS. | Do not use if weathered, corroded or pitted.3 If corroded, there is a potential for samples to be contaminated with iron, chromium, copper or nickel.  Check for compatibility with water chemistry for dedicated applications.  Do not use in low pH, high chloride, or high TDS waters. |
| Low Carbon Steel  Galvanized Steel  Carbon Steel (metals) | Inorganic nonmetallics only. | Coring devices are acceptable for all analyte groups **if** appropriate liners are used.  Use Teflon liners for organics.  Use plastic or Teflon liners for metals.  Do not use if weathered, corroded or pitted.3  If corroded, there is a potential for samples to be contaminated with iron and manganese.  Galvanized equipment will also contaminate with zinc and cadmium.  If used to collect large samples (e.g., dredges), collect organic and metal samples may be collected from portions of the interior of the collected material. |
| Brass (metals) | Inorganic nonmetallics only. | Do not use if weathered, corroded or pitted.3 |
| Teflonand other fluorocarbon polymers (plastics[[4]](#endnote-4)) | All analyte groups except PFAS.  Especially recommended for trace metals and organics. | Easily scratched.  Do not use if scratched or discolored. |
| Polypropylene  Polyethylene  (All Types) (plastics4) | All analyte groups. Recommended for PFAS. | LDPE may not be used for pump tubing when collecting for VOCs. Easily scratched. Do not use if scratched or discolored. Must be PFAS-free if used to collect PFAS. |
| Polyvinyl chloride  (PVC) (plastics4) | All analyte groups except extractable organics, volatile organics, and PFAS. | Do not use when collecting extractable organics, volatile organics, and PFAS samples. |
| Tygon, Silicone, Neoprene (plastics4) | All analyte groups except extractable organics, volatile organics, and PFAS. | Do not use when collecting extractable organics, volatile organics, and PFAS samples (see Table FS 1000-3 for silicone tubing exceptions).  Do not use silicone if sampling for silica. |
| Viton (plastics4) | All analyte groups except extractable organics, volatile organics, and PFAS.[[5]](#endnote-5) | Minimize contact with sample.  Use only if no alternative material exists. |
| Glass, borosilicate (glass) | All analyte groups except PFAS, silica, and boron. | PFAS samples should not come into contact with any glass containers or pipettes as PFAS analytes can potentially adsorb to glass surfaces. |

Adapted from USGS Field Manual, Chapter 2, January 2000.

| **Analyte Group** | **Acceptable Materials[[6]](#endnote-6)** |
| --- | --- |
| Extractable Organics (see Table FS 1000-3 for silicone tubing exceptions) | Teflon and other fluorocarbon polymers  Stainless steel  Glass  Polypropylene (All types)  Polyethylene (All types)  All parts of the system including connectors and gaskets must be considered – Viton may be used if no other material is acceptable. |
| Volatile Organics (see Table FS 1000-3 for silicone tubing exceptions) | Teflon and other fluorocarbon polymers  Stainless steel  Glass  Polypropylene (All types)  Polyethylene (All types excluding LDPE)  All parts of the system including connectors and gaskets must be considered – Viton may be used if no other material is acceptable. |
| Metals | Teflon and other fluorocarbon polymers  Stainless steel  Polyethylene (All types)  Polypropylene (All types)  Tygon, Viton, Silicone, Neoprene  PVC  Glass (except silica and boron) |
| Ultratrace Metals | Teflon and other fluorocarbon polymers  Polyethylene (All types)  Polypropylene (All types)  Polycarbonate  Mercury must be in glass or Teflon |
| Inorganic Nonmetallics | Teflon and other fluorocarbon polymers  Stainless steel  Low carbon, Galvanized or Carbon steel  Polyethylene (All types)  Polypropylene (All types)  Tygon, Viton, Silicone, Neoprene  PVC  Glass  Brass |
| Microbiological samples | Teflon and other fluorocarbon polymers  Stainless steel  Polyethylene (All types)  Polypropylene (All types)  Tygon, Viton, Silicone, Neoprene  PVC  Glass  Sterilize all **sample** containers.  Thoroughly clean **sampling equipment** and rinse several times with sample water before collection. Sampling equipment **does not require** sterilization  **Do not rinse sample containers** |
| PFAS | Stainless steel  Polypropylene (PFAS-free)  High-density polyethylene (PFAS-free) |

| **SAMPLING MATRIX** | **EQUIPMENT** | **HOUSING****[[7]](#endnote-7)** | **TUBING** | **USE** | **PERMISSIBLE ANAYLTE GROUPS** | **RESTRICTIONS AND PRECAUTIONS** |
| --- | --- | --- | --- | --- | --- | --- |
| Water – Groundwater | Positive displacement pump[[8]](#endnote-8) -  *Submersible*  *(turbine, helical rotor, gear driven)* | SS, FP, PE14, PP or PVC if permanently installed | SS, FP, PE14, PP | Purging | All analyte groups | [[9]](#endnote-9), [[10]](#endnote-10), [[11]](#endnote-11) must be variable speed |
| Water – Groundwater | Positive displacement pump2 – *Submersible (turbine, helical rotor, gear driven)* | SS, FP, PE14, PP or PVC if permanently installed | SS, FP, PE14, PP | Sampling | All analyte groups | 3,4,5 must be variable speed  If sampling for PFAS, the tubing must be PP or HDPE |
| Water – Groundwater | Positive displacement pump2 – *Submersible (turbine, helical rotor, gear driven)* | SS, FP | Non-inert[[12]](#endnote-12) | Purging | All analyte groups | 3,4,5 must be variable speed; polishing required[[13]](#endnote-13) |
| Water – Groundwater | Positive displacement pump2 – *Submersible (turbine, helical rotor, gear driven)* | SS, FP | Non-inert6 | Sampling | All analyte groups except volatile organics, extractable organics, and PFAS | Must be variable speed  If sampling for metals, the tubing must be non-metallic if not SS |
| Water- Groundwater | Positive displacement pump2 – *Submersible (turbine, helical rotor, gear driven)* | Non-inert6 | Non-inert6 | Purging | All analyte groups | 3,4,5 must be variable speed; polishing required7 |
| Water – Groundwater | Positive displacement pump2 – *Submersible (turbine, helical rotor, gear driven)* | Non-inert6 | Non-inert6 | Sampling | All analyte groups except volatile organics, extractable organics, and PFAS | Must be variable speed  If sampling for metals, the tubing must be non-metallic if not SS |
| Water – Groundwater | Positive displacement pump2 -  *Bladder pump (no gas contact)* | SS, FP, PE, PP or PVC if permanently installed | SS, FP, PE14, PP | Purging | All analyte groups | 3,4,5 must be variable speed |
| Water – Groundwater | Positive displacement pump2 – *Bladder pump (no gas contact)* | SS, FP, PE, PP or PVC if permanently installed | SS, FP, PE14, PP | Sampling | All analyte groups | 3,4 must be variable speed  Bladder must be Teflon if sampling for volatile or extractable organics or PE or PP if used in portable pumps  If sampling for PFAS, the tubing must be PP or HDPE |
| Water – Groundwater | Positive displacement pump2 – *Bladder pump (no gas contact)* | SS, FP, PE, PP | Non-inert6 | Purging | All analyte groups | 3,4 must be variable speed; polishing required7  **This configuration is not recommended** |
| Water – Groundwater | Positive displacement pump2 – *Bladder pump (no gas contact)* | SS, FP, PE, PP | Non-inert6 | Sampling | All analyte groups except volatile organics, extractable organics, and PFAS | 3,4 must be variable speed  If sampling for metals, the tubing must be non-metallic if not SS |
| Water – Groundwater | Positive displacement pump2 – *Bladder pump (no gas contact)* | Non-inert6 | Non-inert6 | Purging | All analyte groups | 3,4 must be variable speed; polishing required7 |
| Water – Groundwater | Positive displacement pump2 – *Bladder pump (no gas contact)* | Non-inert6 | Non-inert6 | Sampling | All analyte groups except volatile organics, extractable organics, and PFAS | 3,4 must be variable speed; polishing required7  If sampling for metals, the tubing must be non-metallic if not SS |
| Water - Groundwater | Suction lift pump -  Centrifugal | N/A | SS, FP, PE14, PP | Purging | All analyte groups | 4 foot-valve required  Must be variable speed |
| Water – Groundwater | Suction lift pump – Centrifugal | N/A | Non-inert6 | Purging | All analyte groups | 4 foot-valve required; polishing required7  Must be variable speed |
| Water – Groundwater | Suction lift pump -  Peristaltic | N/A | SS, FP, PE14, PP | Purging | All analyte groups | 4 foot-valve required; polishing required7 or continuous pumping required  Must be variable speed |
| Water – Groundwater | Suction lift pump – Peristaltic | N/A | SS, FP, PE14, PP | Sampling | All analyte groups | 4 Silicone tubing in pump head  Must be variable speed  If sampling for PFAS, the tubing must be PP or HDPE |
| Water – Groundwater | Suction lift pump – Peristaltic | N/A | Non-inert6 | Purging | All analyte groups | 4 foot-valve required  Must be variable speed |
| Water – Groundwater | Suction lift pump – Peristaltic | N/A | Non-inert6 | Sampling | All analyte groups except volatile organics, extractable organics, and PFAS | 4 Silicone tubing in pump head  Must be variable speed |
| Water - Groundwater | Bailers | SS, FP, PE, PP | N/A | Purging | All analyte groups | None; **not recommended** |
| Water – Groundwater | Bailers | SS, FP, PE, PP | N/A | Sampling | All analyte groups except volatile organics, extractable organics, and PFAS | None; **not recommended**  If sampling for metals, the tubing must be non-metallic if not SS |
| Water – Groundwater | Bailers | Non-inert6 | N/A | Purging | All analyte groups | None; **not recommended** |
| Water – Groundwater | Bailers | Non-inert6 | N/A | Sampling | All analyte groups except volatile organics, extractable organics, and PFAS | None; **not recommended**  If sampling for metals, the tubing must be non-metallic if not SS |
| Water – Surface water | Intermediate containers such as pond sampler, scoops, beakers, buckets, and dippers | SS, FP, FP -coated, PE, PP | N/A | Grab sampling | All analyte groups | None  If sampling for PFAS, the housing must be PP or HDPE |
| Water – Surface water | Intermediate containers such as pond sampler, scoops, beakers, buckets, and dippers | Glass | N/A | - | All analyte groups except boron, fluoride, and PFAS | None |
| Water – Surface water | Intermediate containers such as pond sampler, scoops, beakers, buckets, and dippers | Non-inert6 | N/A | - | All analyte groups except volatile organics, extractable organics, and PFAS | None |
| Water – Surface water | Nansen, Kemmerer, Van Dorn, Alpha and Beta Samplers, Niskin (or equivalent) | SS, FP, FP -coated, PE, PP | N/A | Specific depth grab sampling | All analyte groups | None  If sampling for PFAS, the housing must be PP or HDPE |
| Water – Surface water | Nansen, Kemmerer, Van Dorn, Alpha and Beta Samplers, Niskin (or equivalent) | Non-inert6 | N/A | - | All analyte groups except volatile organic, extractable organics, and PFAS | None |
| Water – Surface water | DO Dunker | SS, FP glass, PE, PP | N/A | Water column composite sampling | All analyte groups except PFAS | None  Samples for PFAS must be grab samples |
| Water – Surface water | Bailers – double valve | SS, FP, PE, PP | N/A | Grab sampling | All analyte groups | None  If sampling for PFAS, the housing must be PP or HDPE |
| Water – Surface water | Bailers – double valve | Non-inert6 | N/A | Grab sampling | All analyte groups except volatile organics, extractable organics, and PFAS | None  If sampling for metals, the tubing must be non-metallic if not SS |
| Water – Surface water | Peristaltic pump | N/A | SS, FP, PE14, PP | Specific depth sampling | All analyte groups | Silicone tubing in pump head  Must be variable speed  If sampling for PFAS, the tubing must be HDPE |
| Water – Surface water | Peristaltic pump | N/A | Non-inert6 | - | All analyte groups except volatile organics, extractable organics, and PFAS | Silicone tubing in pump head  Must be variable speed |
| Water- Surface water | Field filtration units | N/A | - | Dissolved constituents | Inorganic nonmetallic and metals in surface water | Must use a 0.45 µm filter |
| Water-Surface water | Field filtration units | N/A | - | Dissolved constituents | Metals in moving surface water (i.e., river/stream) | Must use a 0.45 µm filter |
| Water- Groundwater | Field filtration units | N/A | - | Dissolved constituents | Inorganic nonmetallic in groundwater | Must use a 0.45 µm filter |
| Water-Groundwater | Field filtration units | N/A | - | Dissolved constituents | Metals in groundwater and static wastewater and surface water | Must use in-line, high capacity one piece molded filter that is connected to the outlet of a pump; no intermediate vessels; positive pressure PE, PP & FP bailers acceptable  Must use a 1 µm filter in groundwater |
| Solid – Soils | Core barrel (or liner) | SS, FP, glass, FP -coated, aluminum, PE, PP | N/A | Sampling | All analyte groups[[14]](#endnote-14) | [[15]](#endnote-15), [[16]](#endnote-16), [[17]](#endnote-17)  If sampling for PFAS, the housing must be SS |
| Solid – Soils | Core barrel (or liner) | Non-inert6 nonmetallics | N/A | Sampling | All analyte groups except PFAS | [[18]](#endnote-18) |
| Solid – Soils | Core barrel (or liner) | Non-inert6 metals | N/A | Sampling | All analyte groups except PFAS | 12 |
| Solid - Soils | Trowel, scoop, spoon or spatula | SS, FP, FP -coated, PE, PP | N/A | Sampling | All analyte groups8 | If sampling for PFAS, the housing must be SS |
| Solid – Soils | Trowel, scoop, spoon or spatula | SS, FP, FP -coated, PE, PP | N/A | Compositing | All analyte groups except volatile organics and PFAS | Samples for volatile organics and PFAS must be grab samples |
| Solid – Soils | Trowel, scoop, spoon or spatula | Plastic | N/A | Sampling and compositing | All analyte groups except volatile organics, extractable organics, and PFAS | None  Must be nonmetallic if not SS |
| Solid - Soils | Mixing tray (pan) | SS, FP, glass, FP -coated, aluminum, PE, PP | N/A | Sampling | All analyte groups8 | 11  If sampling for PFAS, the housing must be SS |
| Solid – Soils | Mixing tray (pan) | SS, FP, glass, FP -coated, aluminum, PE, PP | N/A | Compositing or homogenizing | All analyte groups except volatile organics and PFAS | 11 |
| Solid – Soils | Mixing tray (pan) | Non-inert6 | N/A | Compositing or homogenizing | All analyte groups except PFAS | 10,11,12 must be nonmetallic if not SS |
| Solid - Soils | Shovel, bucket auger | SS | N/A | Sampling | All analyte groups8 | None |
| Solid – Soils | Shovel, bucket auger | Non-SS | N/A | Sampling | All analyte groups8 except PFAS | 10,11,12 |
| Solid - Soils | Split spoon | SS or carbon steel w/ FP insert | N/A | Sampling | All analyte groups8 | 10,11,12  If sampling for PFAS, the housing must be SS |
| Solid - Soils | Shelby tube | SS | N/A | Sampling | All analyte groups8 | 9 |
| Solid – Soils | Shelby tube | Carbon steel | N/A | Sampling | All analyte groups except PFAS | 9,10,12 |
| Solid - Sediment | Coring devices | SS, FP, glass, FP-coated, aluminum, PE, PP | N/A | Sampling | All analyte groups8 | 9,10,11  If sampling for PFAS, the housing must be SS |
| Solid – Sediment | Coring devices | Non-inert6 nonmetallics | N/A | Sampling | All analyte groups except PFAS | 12 |
| Solid – Sediment | Coring devices | Non-inert6 metals | N/A | Sampling | All analyte groups except PFAS | 9,10,11 |
| Solid - Sediment | Grab – Young, Petersen, Shipek | FP, FP-lined, SS | N/A | Sampling | All analyte groups8 | None  If sampling for PFAS, the housing must be SS |
| Solid – Sediment | Grab – Young, Petersen, Shipek | Carbon steel | N/A | Sampling | All analyte groups except PFAS | 10,11 |
| Solid - Sediment | Dredges – Eckman, Ponar, Petit Ponar  Van Veen | SS | N/A | Sampling | All analyte groups8 | None |
| Solid – Sediment | Dredges – Eckman, Ponar, Petit Ponar, Van Veen | Carbon steel, brass | N/A | Sampling | All analyte groups except PFAS | 10,11 |
| Solid - Sediment | Trowel, scoop, spoon or spatula | SS, FP, FP-coated, PE, PP | N/A | Sampling | All analyte groups8 | If sampling for PFAS, the housing must be SS |
| Solid – Sediment | Trowel, scoop, spoon or spatula | SS, FP, FP-coated, PE, PP | N/A | Compositing | All analyte groups except volatile organics and PFAS | Samples for volatile organics and PFAS must be grab samples |
| Solid – Sediment | Trowel, scoop, spoon or spatula | Plastic | N/A | Sampling and compositing | All analyte groups except volatile organics, extractable organics, and PFAS | None  must be nonmetallic if not SS |
| Solid - Sediment | Mixing tray (pan) | SS, FP, glass, FP-coated, aluminum, PE, PP | N/A | Sampling | All analyte groups8 | 11  If sampling for PFAS, the housing must be SS |
| Solid – Sediment | Mixing tray (pan) | SS, FP, glass, FP-coated, aluminum, PE, PP | N/A | Compositing or homogenizing | All analyte groups except volatile organics and PFAS | 11 |
| Solid – Sediment | Mixing tray (pan) | Non-inert6 | N/A | Compositing or homogenizing | All analyte groups except volatile organics, extractable organics, and PFAS | none  11 must be nonmetallic if not SS |
| Waste[[19]](#endnote-19) | Scoop | SS | N/A | Liquids, solids & sludges | All analyte groups8 | Cannot collect deeper phases |
| Waste13 | Spoon | SS | N/A | Solids, sludges | All analyte groups8 | Cannot collect deeper phases |
| Waste13 | Push tube | SS | N/A | Solids, sludges | All analyte groups8 | Cannot collect deeper phases |
| Waste13 | Auger | SS | N/A | Solids | All analyte groups8 | None |
| Waste13 | Sediment sampler | SS | N/A | Impoundments, piles | All analyte groups8 | None |
| Waste13 | Ponar dredge | SS | N/A | Solids, sludges & sediments | All analyte groups8 | None |
| Waste13 | Coliwasa, Drum thief | Glass | N/A | Liquids, sludges | All analyte groups except PFAS | None |
| Waste13 | Mucksucker, Dipstick | FP | - | Liquids, sludges | All analyte groups except PFAS | Not recommended for tanks > 11 feet deep |
| Waste13 | Bacon bomb | SS | N/A | Liquids | All analyte groups8 | Not recommended for viscous wastes |
| Waste13 | Bailer | SS, FP | N/A | Liquids | All analyte groups8 | Do not use with heterogeneous wastes  Not recommended for viscous wastes  If sampling for PFAS, the housing must be SS |
| Waste13 | Peristaltic pump | N/A | FP, Glass | Liquids | All analyte groups except volatile organics and PFAS | Do not use in flammable atmosphere  Not recommended for viscous wastes |
| Waste13 | Backhoe bucket | Steel | N/A | Solids, Sludges | - | Difficult to clean  Volatiles and metals must be taken from the interior part of the sample  If sampling for PFAS, the housing must be SS |
| Waste13 | Split spoon | SS | N/A | Solids | All analyte groups8 | - |
| Waste13 | Roto-Hammer | Steel | N/A | Solids | All analyte groups8 | Physically breaks up sample  Not for flammable atmospheres  If sampling for PFAS, the housing must be SS |

Acronyms:

N/A not applicable

SS stainless steel

HDPE high-density polyethylene

FP fluoropolymer (polytetrafluoroethylene (PTFE; Teflon®), or other fluoropolymer

PE polyethylene

PVC polyvinyl chloride

PP polypropylene

LDPE low density polyethylene[[20]](#endnote-20)

| **Test** | **Parameter No./Name** (refers to parameter number on Tables IA,B, C, D,E, F, G & H as noted) | **Container1** | **Preservation2,** 3 | **Maximum holding time4** |
| --- | --- | --- | --- | --- |
| Table IA Bacterial | 1–4. Coliform, total, fecal, and *E. coli* | PA, G | Cool, <10 °C, 0.008% Na2S2O35 | 8 hours 22 , 23 |
| Table IA Bacterial | 5. Fecal streptococci | PA, G | Cool, <10 °C, 0.008% Na2S2O35 | 8 hours 22 |
| Table IA Bacterial | 6. Enterococci | PA, G | Cool, <10 °C, 0.008% Na2S2O35 | 8 hours 22 |
| Table IA Bacterial | 7. Salmonella | PA, G | Cool, <10 °C, 0.008% Na2S2O35 | 8 hours 22 |
| Table IA Aquatic Toxicity | 8–11. Toxicity, acute and chronic | P, FP, G | Cool, ≤6 °C 16 | 36 hours |
| Table IB Inorganic | 1. Acidity | P, FP, G | Cool, ≤6 °C18 | 14 days |
| Table IB Inorganic | 2. Alkalinity | P, FP, G | Cool, ≤6 °C18 | 14 days |
| Table IB Inorganic | 4. Ammonia | P, FP, G | Cool, ≤6 °C18, H2SO4 to pH<2 | 28 days |
| Table IB Inorganic | 9. Biochemical oxygen demand | P, FP, G | Cool, ≤6 °C18 | 48 hours |
| Table IB Inorganic | 10. Boron | P, FP, or Quartz | HNO3 to pH<2 | 6 months |
| Table IB Inorganic | 11. Bromide | P, FP, G | None required | 28 days |
| Table IB Inorganic | 14. Biochemical oxygen demand, carbonaceous | P, FP G | Cool, ≤6 °C18 | 48 hours |
| Table IB Inorganic | 15. Chemical oxygen demand | P, FP, G | Cool, ≤6 °C18, H2SO4 to pH<2 | 28 days |
| Table IB Inorganic | 16. Chloride | P, FP, G | None required | 28 days |
| Table IB Inorganic | 17. Chlorine, total residual | P, G | None required | Analyze within 15 minutes |
| Table IB Inorganic | 21. Color | P, FP, G | Cool, ≤6 °C18 | 48 hours |
| Table IB Inorganic | 23–24. Cyanide, total or available (or CATC)and free | P, FP, G | Cool, ≤6 °C18, NaOH to pH>10 5, 6 reducing agent if oxidizer is present, | 14 days |
| Table IB Inorganic | 25. Fluoride | P | None required | 28 days |
| Table IB Inorganic | 27. Hardness | P, FP, G | HNO3 or H2SO4 to pH<2 | 6 months |
| Table IB Inorganic | 28. Hydrogen ion (pH) | P, FP, G | None required | Analyze within 15 minutes |
| Table IB Inorganic | 31, 43. Kjeldahl and organic N | P, FP, G | Cool, ≤6 °C18, H2SO4 to pH<2 | 28 days |
| Table IB Metals7 | 18. Chromium VI | P, FP, G | Cool, ≤6 °C18, pH = 9.3–9.720 | 28 days |
| Table IB Metals7 | 35. Mercury (CVAA) | P, FP, G | HNO3 to pH<2 | 28 days |
| Table IB Metals7 | 35. Mercury (CVAFS) | FP, G; and FP-lined cap | 5 mL/L 12N HCl or 5 mL/L BrCl17 | 90 days 17 |
| Table IB Metals7 | 3, 5–8, 12, 13, 19, 20, 22, 26, 29, 30, 32–34, 36, 37, 45, 47, 51, 52, 58–60, 62, 63, 70– 72, 74, 75. Metals, except boron, chromium VI, and mercury. | P, FP, G | HNO3 to pH<2, or at least 24 hours prior to analysis19 | 6 months |
| Table IB Inorganic | 38. Nitrate | P, FP, G | Cool, ≤6 °C18 | 48 hours |
| Table IB Inorganic | 39. Nitrate-nitrite | P, FP, G | Cool, ≤6 °C18, H2SO4 to pH<2 | 28 days |
| Table IB Inorganic | 40. Nitrite | P, FP, G | Cool, ≤6 °C18 | 48 hours |
| Table IB Inorganic | 41. Oil and grease | G | Cool, ≤6 °C18, HCl or H2SO4 to pH<2 | 28 days |
| Table IB Inorganic | 42. Organic Carbon | P, FP, G | Cool, ≤6 °C18HCl, H2SO4, or H3PO4 to pH<2. | 28 days |
| Table IB Inorganic | 44. Orthophosphate | P, FP, G | Cool, ≤6 °C18, 24 | Filter within 15 minutes; Analyze within 48 hours |
| Table IB Inorganic | 46. Oxygen, Dissolved Probe | G, Bottle and top | None required | Analyze within 15 minutes |
| Table IB Inorganic | 47. Winkler | G, Bottle and top | Fix on site and store in dark | 8 hours |
| Table IB Inorganic | 48. Phenols | G | Cool, ≤6 °C18, H2SO4 to pH<2 | 28 days |
| Table IB Inorganic | 49. Phosphorous (elemental) | G | Cool, ≤6 °C18 | 48 hours |
| Table IB Inorganic | 50. Phosphorous, total | P, FP, G | Cool, ≤6 °C18, H2SO4 to pH<2 | 28 days |
| Table IB Inorganic | 53. Residue, total | P, FP, G | Cool, ≤6 °C18 | 7 days |
| Table IB Inorganic | 54. Residue, Filterable (TDS) | P, FP, G | Cool, ≤6 °C18 | 7 days |
| Table IB Inorganic | 55. Residue, Nonfilterable (TSS) | P, FP, G | Cool, ≤6 °C18 | 7 days |
| Table IB Inorganic | 56. Residue, Settleable | P, FP, G | Cool, ≤6 °C18 | 48 hours |
| Table IB Inorganic | 57. Residue, Volatile | P, FP, G | Cool, ≤6 °C18 | 7 days |
| Table IB Inorganic | 61. Silica | P or Quartz | Cool, ≤6 °C18 | 28 days |
| Table IB Inorganic | 64. Specific conductance | P, FP, G | Cool, ≤6 °C18 | 28 days |
| Table IB Inorganic | 65. Sulfate | P, FP, G | Cool, ≤6 °C18 | 28 days |
| Table IB Inorganic | 66. Sulfide | P, FP, G | Cool, ≤6 °C18, add zinc acetate plus sodium hydroxide to pH>9 | 7 days |
| Table IB Inorganic | 67. Sulfite | P, FP, G | None required | Analyze within 15 minutes |
| Table IB Inorganic | 68. Surfactants | P, FP, G | Cool, ≤6 °C18 | 48 hours |
| Table IB Inorganic | 69. Temperature | P, FP, G | None required | Analyze within 15 minutes |
| Table IB Inorganic | 73. Turbidity | P, FP, G | Cool, ≤6 °C18 | 48 hours |
| Table IC Organic8 | 13, 18–20, 22, 24, 25, 27, 28, 34–37, 39–43, 45–47, 56, 76, 104, 105, 108–111, 113. Purgeable Halocarbons | G, FP-lined septum | Cool, ≤6 °C18, 0.008% Na2S2O35,HCl to pH 2 9 | 14 days 9 |
| Table IC Organic8 | 26. 2-Chloroethylvinyl ether | G, FP-lined septum | Cool, ≤6 °C18, 0.008% Na2S2O35 | 14 days |
| Table IC Organic8 | 6, 57, 106. Purgeable aromatic hydrocarbons | G, FP-lined septum | Cool, ≤6 °C18, 0.008% Na2S2O35, HCl to pH 2 9 | 14 days9 |
| Table IC Organic8 | 3, 4. Acrolein and acrylonitrile | G, FP-lined septum | Cool, ≤6 °C18, 0.008% Na2S2O35 , pH to 4–510 | 14 days10 |
| Table IC Organic8 | 23, 30, 44, 49, 53, 77, 80, 81, 98, 100, 112. Phenols11 | G, FP-lined cap | Cool, ≤6 °C18, 0.008% Na2S2O3 5 | 7 days until extraction, 40 days after extraction |
| Table IC Organic8 | 7, 38. Benzidines11, 12 | G, FP-lined cap | Cool, ≤6 °C18, 0.008% Na2S2O35 | 7 days until extraction13 |
| Table IC Organic8 | 14, 17, 48, 50–52. Phthalate esters 11 | G, FP-lined cap | Cool, ≤6 °C18 | 7 days until extraction, 40 days after extraction |
| Table IC Organic8 | 82–84. Nitrosamines11, 14 | G, FP-lined cap | Cool, ≤6 °C18, store in dark, 0.008% Na2S2O35 | 7 days until extraction, 40 days after extraction |
| Table IC Organic8 | 88–94. PCBs11 | G, FP-lined cap | Cool, ≤6 °C18 | 1 year until extraction, 1 year after extraction |
| Table IC Organic8 | 54, 55, 75, 79. Nitroaromatics and isophorone 11 | G, FP-lined cap | Cool, ≤6 °C18, store in dark, 0.008% Na2S2O35 | 7 days until extraction, 40 days after extraction |
| Table IC Organic8 | 1, 2, 5, 8–12, 32, 33, 58, 59, 74, 78, 99, 101. Polynuclear aromatic hydrocarbons11 | G, FP-lined cap | Cool, ≤6 °C18store in dark, 0.008% Na2S2O35 | 7 days until extraction, 40 days after extraction |
| Table IC Organic8 | 15, 16, 21, 31, 87. Haloethers11 | G, FP-lined cap | Cool, ≤6 °C18, 0.008% Na2S2O35 | 7 days until extraction, 40 days after extraction |
| Table IC Organic8 | 29, 35–37, 63–65, 73, 107. Chlorinated hydrocarbons 11 | G, FP-lined cap | Cool, ≤6 °C18 | 7 days until extraction, 40 days after extraction |
| Table IC Organic8 | 60–62, 66–72, 85, 86, 95–97, 102, 103. CDDs/CDFs 11 | G | See footnote 11 | See footnote 11 |
| Table IC Organic8 | Aqueous Samples: Field and Lab Preservation | G | Cool, ≤6 °C18, 0.008% Na2S2O35 , pH<9 | 1 year |
| Table IC Organic8 | Solids and Mixed-Phase Samples: Field Preservation | G | Cool, ≤6 °C18 | 7 days |
| Table IC Organic8 | Tissue Samples: Field Preservation | G | Cool, ≤6 °C18 | 24 hours |
| Table IC Organic8 | Solids, Mixed-Phase, and Tissue Samples: Lab Preservation | G | Freeze, ≤-10 °C | 1 year |
| Table IC Organic8 | 114-118. Alkylated phenols | G | Cool, <6 °C, H2SO4 to pH<2 | 28 days until extraction, 40 days after extraction |
| Table IC Organic8 | 119. Adsorbable Organic Halides (AOX) | G | Cool, <6 °C, 0.008% Na2S2O35 HNO3 to pH<2 | Hold at least 3 days, but not more than 6 months |
| Table IC Organic8 | 120. Chlorinated Phenolics | G, FP-lined cap | Cool, <6 °C, 0.008% Na2S2O35 5H2SO4 to pH<2 | 30 days until acetylation, 30 days after acetylation. |
| Table ID Pesticides | Tests: 1–70. Pesticides11 | G, FP-lined cap | Cool, ≤6 °C18, pH 5–915 | 7 days until extraction, 40 days after extraction |
| Table IE Radiological | 1–5. Alpha, beta, and radium | P, FP, G | HNO3 to pH<2 | 6 months |
| Table IH Bacterial | 1, 2 Coliform, total, fecal | PA, G | Cool, <10 °C, 0.008% Na2S2O3 5 | 8 hours 22 |
| Table IH Bacterial | 3. *E. coli* | PA, G | Cool, <10 °C, 0.008% Na2S2O3 5 | 8 hours 22 |
| Table IH Bacterial | 4. Fecal streptococci | PA, G | Cool, <10°C, 0.008% Na2S2O3 5 | 8 hours 22 |
| Table IH Bacterial | 5. Enterococci | PA, G | Cool, <10 °C, 0.008% Na2S2O35 | 8 hours 22 |
| Table IH Protozoan | 6. Cryptosporidium | LDPE; field filtration | 1–10 °C | 96 hours.21 |
| Table IH Protozoan | 7. Giardia | LDPE; field filtration | 1–10 °C | 96 hours21 |

\*Reference: This table is adapted from Table II, 40 CFR, Ch.I, Part 136.3, *Identification of Test Procedures,* including all footnotes listed below.

1“P” is for polyethylene; “FP” is fluoropolymer (polytetrafluoroethylene [PTFE]; Teflon®), or other fluoropolymer, unless stated otherwise in this Table II; “G” is glass; “PA” is any plastic that is made of a sterilizable material (polypropylene or other autoclavable plastic); “LDPE” is low density polyethylene.

2Except where noted in this Table II and the method for the parameter, preserve each grab sample within 15 minutes of collection. For a composite sample collected with an automated sample (*e.g.,* using a 24-hour composite sample; see 40 CFR 122.21(g)(7)(i) or 40 CFR part 403, appendix E), refrigerate the sample at ≤6 °C during collection unless specified otherwise in this Table II or in the method(s). For a composite sample to be split into separate aliquots for preservation and/or analysis, maintain the sample at ≤6 °C, unless specified otherwise in this Table II or in the method(s), until collection, splitting, and preservation is completed. Add the preservative to the sample container prior to sample collection when the preservative will not compromise the integrity of a grab sample, a composite sample, or aliquot split from a composite sample within 15 minutes of collection. If a composite measurement is required but a composite sample would compromise sample integrity, individual grab samples must be collected at prescribed time intervals (*e.g.,* 4 samples over the course of a day, at 6-hour intervals). Grab samples must be analyzed separately and the concentrations averaged. Alternatively, grab samples may be collected in the field and composited in the laboratory if the compositing procedure produces results equivalent to results produced by arithmetic averaging of results of analysis of individual grab samples. For examples of laboratory compositing procedures, see EPA Method 1664 Rev. A (oil and grease) and the procedures at 40 CFR 141.24(f)(14)(iv) and (v) (volatile organics).

3When any sample is to be shipped by common carrier or sent via the U.S. Postal Service, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirement of Table II, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater; Nitric acid (HNO3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H2SO4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

4Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before the start of analysis and still be considered valid. Samples may be held for longer periods only if the permittee or monitoring laboratory have data on file to show that, for the specific types of samples under study, the analytes are stable for the longer time, and has received a variance from the Regional ATP Coordinator under §136.3(e). For a grab sample, the holding time begins at the time of collection. For a composite sample collected with an automated sampler (*e.g.,* using a 24-hour composite sampler; see 40 CFR 122.21(g)(7)(i) or 40 CFR part 403, appendix E), the holding time begins at the time of the end of collection of the composite sample. For a set of grab samples composited in the field or laboratory, the holding time begins at the time of collection of the last grab sample in the set. Some samples may not be stable for the maximum time period given in the table. A permittee or monitoring laboratory is obligated to hold the sample for a shorter time if it knows that a shorter time is necessary to maintain sample stability. See §136.3(e) for details. The date and time of collection of an individual grab sample is the date and time at which the sample is collected. For a set of grab samples to be composited, and that are all collected on the same calendar date, the date of collection is the date on which the samples are collected. For a set of grab samples to be composited, and that are collected across two calendar dates, the date of collection is the dates of the two days; *e.g.,* November 14-15. For a composite sample collected automatically on a given date, the date of collection is the date on which the sample is collected. For a composite sample collected automatically, and that is collected across two calendar dates, the date of collection is the dates of the two days; *e.g.,* November 14-15. For static-renewal toxicity tests, each grab or composite sample may also be used to prepare test solutions for renewal at 24 h, 48 h, and/or 72 h after first use, if stored at 0-6 °C, with minimum head space.

5ASTM D7365-09a specifies treatment options for samples containing oxidants (*e.g.,* chlorine) for cyanide analyses. Also, Section 9060A of Standard Methods for the Examination of Water and Wastewater (23rd edition) addresses dechlorination procedures for microbiological analyses. Sodium thiosulfate should only be added to samples to be used for measurement of bacteria, PAHs or other organic pollutants if residual chlorine or other oxidants are known or suspected to be present.

6Sampling, preservation and mitigating interferences in water samples for analysis of cyanide are described in ASTM D7365-09a(15). There may be interferences that are not mitigated by the analytical test methods or D7365-09a (15). Any technique for removal or suppression of interference may be employed, provided the laboratory demonstrates that it more accurately measures cyanide through quality control measures described in the analytical test method. Any removal or suppression technique not described in D7365-09a (15) or the analytical test method must be documented along with supporting data.

7For dissolved metals, filter grab samples within 15 minutes of collection and before adding preservatives. For a composite sample collected with an automated sampler (*e.g.,* using a 24-hour composite sampler; see 40 CFR 122.21(g)(7)(i) or 40 CFR part 403, appendix E), filter the sample within 15 minutes after completion of collection and before adding preservatives. If it is known or suspected that dissolved sample integrity will be compromised during collection of a composite sample collected automatically over time (*e.g.,* by interchange of a metal between dissolved and suspended forms), collect and filter grab samples to be composited (footnote 2) in place of a composite sample collected automatically.

8Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.

9If the sample is not adjusted to pH 2, then the sample must be analyzed within seven days of sampling.

10The pH adjustment is not required if acrolein will not be measured. Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

11When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity (*i.e.,* use all necessary preservatives and hold for the shortest time listed). When the analytes of concern fall within two or more chemical categories, the sample may be preserved by cooling to ≤6 °C, reducing residual chlorine with 0.008% sodium thiosulfate, storing in the dark, and adjusting the pH to 6-9; samples preserved in this manner may be held for seven days before extraction and for forty days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (regarding the requirement for thiosulfate reduction), and footnotes 12, 13 (regarding the analysis of benzidine).

12If 1,2-diphenylhydrazine is likely to be present, adjust the pH of the sample to 4.0 ± 0.2 to prevent rearrangement to benzidine.

13Extracts may be stored up to 30 days at <0 °C.

14For the analysis of diphenylnitrosamine, add 0.008% Na2S2O3 and adjust pH to 7-10 with NaOH within 24 hours of sampling.

15The pH adjustment may be performed upon receipt at the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin, add 0.008% Na2S2O3.

16Place sufficient ice with the samples in the shipping container to ensure that ice is still present when the samples arrive at the laboratory. However, even if ice is present when the samples arrive, immediately measure the temperature of the samples and confirm that the preservation temperature maximum has not been exceeded. In the isolated cases where it can be documented that this holding temperature cannot be met, the permittee can be given the option of on-site testing or can request a variance. The request for a variance should include supportive data which show that the toxicity of the effluent samples is not reduced because of the increased holding temperature. Aqueous samples must not be frozen. Hand-delivered samples used on the day of collection do not need to be cooled to 0 to 6 °C prior to test initiation.

17Samples collected for the determination of trace level mercury (<100 ng/L) using EPA Method 1631 must be collected in tightly-capped fluoropolymer or glass bottles and preserved with BrCl or HCl solution within 48 hours of sample collection. The time to preservation may be extended to 28 days if a sample is oxidized in the sample bottle. A sample collected for dissolved trace level mercury should be filtered in the laboratory within 24 hours of the time of collection. However, if circumstances preclude overnight shipment, the sample should be filtered in a designated clean area in the field in accordance with procedures given in Method 1669. If sample integrity will not be maintained by shipment to and filtration in the laboratory, the sample must be filtered in a designated clean area in the field within the time period necessary to maintain sample integrity. A sample that has been collected for determination of total or dissolved trace level mercury must be analyzed within 90 days of sample collection.

18Aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. Also, for purposes of NPDES monitoring, the specification of “≤ °C” is used in place of the “4 °C” and “<4 °C” sample temperature requirements listed in some methods. It is not necessary to measure the sample temperature to three significant figures (1/100th of 1 degree); rather, three significant figures are specified so that rounding down to 6 °C may not be used to meet the ≤6 °C requirement. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

19An aqueous sample may be collected and shipped without acid preservation. However, acid must be added at least 24 hours before analysis to dissolve any metals that adsorb to the container walls. If the sample must be analyzed within 24 hours of collection, add the acid immediately (see footnote 2). Soil and sediment samples do not need to be preserved with acid. The allowances in this footnote supersede the preservation and holding time requirements in the approved metals methods.

20To achieve the 28-day holding time, use the ammonium sulfate buffer solution specified in EPA Method 218.6. The allowance in this footnote supersedes preservation and holding time requirements in the approved hexavalent chromium methods, unless this supersession would compromise the measurement, in which case requirements in the method must be followed.

21Holding time is calculated from time of sample collection to elution for samples shipped to the laboratory in bulk and calculated from the time of sample filtration to elution for samples filtered in the field.

22Sample analysis should begin as soon as possible after receipt; sample incubation must be started no later than 8 hours from time of collection.

23For fecal coliform samples for sewage sludge (biosolids) only, the holding time is extended to 24 hours for the following sample types using either EPA Method 1680 (LTB-EC) or 1681 (A-1): Class A composted, Class B aerobically digested, and Class B anaerobically digested.

24The immediate filtration requirement in orthophosphate measurement is to assess the dissolved or bio-available form of orthophosphorus (*i.e.,* that which passes through a 0.45-micron filter), hence the requirement to filter the sample immediately upon collection (*i.e.,* within 15 minutes of collection).

| Analyte | **Methods** | **Reference** [[21]](#endnote-21) | **Container**[[22]](#endnote-22) | **Preservation**[[23]](#endnote-23) | **Maximum Holding Time**[[24]](#endnote-24) |
| --- | --- | --- | --- | --- | --- |
| Anatoxin-a | Liquid Chromatography |  | PP, G | Cool 6°C, NaHSO4 to pH<2 | 28 days |
| Bromine | DPD Colorimetric[[25]](#endnote-25) | SM 4500-Cl-G | PE, G | None required | Analyze immediately |
| Bromates | Ion Chromatography | EPA 300.0 [[26]](#endnote-26) | PE, G | Cool 4°C | 28 days |
| Chlorophylls | Spectrophotometric | SM 10150  EPA 446.0 | PE, G[[27]](#endnote-27) | Dark 4°C  Filtered, dark, -20°C | 48 hours chilled until filtration[[28]](#endnote-28), and analyze immediately or  48 hours chilled until filtration8,and 28 days (frozen)after filtration |
| Corrosivity | Calculated  (CaCO3 Stability, Langelier Index) | SM 2330  ASTM D513-92 | PE, G | Cool 4°C[[29]](#endnote-29) | 7 days9 |
| Cyanotoxin16 | ELISA and LC/MS/MS |  | G7 | Cool 6°C | 7 days until extraction, 40 days after extraction |
| FL-PRO | Gas Chromatography | DEP (11/2/18)18 | G, FP lined cap only | Cool 6°C, H2SO4 or HCl to pH<2 | 7 days until extraction, 40 days after extraction |
| Odor | Human Panel | SM 2150 | G only | Cool 6°C | 6 hours |
| Salinity | Electrometric [[30]](#endnote-30)  Hydrometric10 | SM 2520 B  SM 2520 C | G, wax seal | Analyze immediately or use wax seal | 30 days10 |
| Taste | Human Panel | SM 2160 B, C, D  ASTM E679-91 | G only | Cool 6°C | 24 hours |
| Total Dissolved Gases | Direct-sensing Membrane-diffusion | SM 2810 | - | - | Analyze in-situ |
| Total Petroleum Hydrocarbons | Gravimetry | EPA 166417 | G only | Cool 6°C, H2SO4 or HCl to pH<2 | 28 days |
| Transparency | Irradiometric[[31]](#endnote-31) | 62-302.200(6), FAC | - | - | Analyze in-situ |
| Un-ionized Ammonia | Calculated[[32]](#endnote-32) | DEP-SOP[[33]](#endnote-33) | PE, G | Cool 6°C  Na2S2O3 12 | 8 hours unpreserved  28 days preserved 12 |
| Organic Pesticides14 | GC and HPLC | EPA (600-series) [[34]](#endnote-34) | [[35]](#endnote-35) | 15 | 15 [[36]](#endnote-36) |
| Per- and Polyfluoroalkyl Substances | LC/MS/MS | EPA 8327 | PP, HDPE | Cool ≤6°C from collection to analysis | 14 days until extraction; 30 days after extraction |
| Per- and Polyfluoroalkyl Substances | LC/MS/MS | EPA 1633 | HDPE | Cool ≤6°C in dark to transport | 28 days in dark 0-6°C or 90 days in dark ≤-20 °C until extraction, 90 days at <6°C after extraction |

\*40 CFR, Ch. I, Part 136.3, *Identification of Test Procedures*. Reference provided for informational purposes only.

| **Analyte** | Methods | **References\*** | **Container** | **Preservation** | **Maximum Holding Times** |
| --- | --- | --- | --- | --- | --- |
| Volatile Organics | Purge-and-Trap GC and GC-MS | 8015, 8260, 8021, 5035 | See Table 1000-7 | See Table 1000-7 | See Table 1000-7 |
| Semivolatile Organics | GC, HPLC, and GC-MS | 8041, 8061, 8070, 8081, 8082, 8091, 8111, 8121, 8131, 8141, 8151, 8270, 8275, 8280, 8290, 8310, 8315, 8316, 8318, 8321, 8325, 8330, 8331, 8332, 8410, 8430, 8440, FL-PRO, MADEP, TPHWG | Glass, 8 oz widemouth with Teflon® -Lined lid | Cool ≤6°C [[37]](#endnote-37) | 14 days until extraction, 40 days after extraction |
| Dioxins | - | 8290 | Amber Glass, 8 oz widemouth with Teflon® -Lined lid | Cool ≤6°C1 in dark | 30 days until extraction, 45 days after extraction |
| Total Metals-except mercury and chromium VI methods | Flame AA, Furnace AA, Hydride and ICP | All 7000-series (except 7195, 7196, 7197, 7198, 7470 and 7471), 6010 (ICP) and 6020 (ICP) | Glass or plastic 8 oz widemouth (200 grams sample) | None | 6 months |
| Chromium VI | Colorimetric, Chelation with Flame AA - (200 gram sample) | 7196 and 7197 (prep 3060) | Glass or plastic, 8 oz widemouth (200 gram sample) | Cool ≤6°C °C1 | 1 month until extraction, 4 days after extraction [[38]](#endnote-38) |
| Mercury | Manual Cold Vapor AA | 7471 | Glass or plastic 8 oz widemouth (200 grams sample) | Cool ≤6°C °C1 | 28 days |
| Microbiology (MPN) | - | MPN | Sterile glass or plastic | Cool ≤6°C1 | 24 hours |
| Aggregate Properties | - | - | Glass or plastic | Cool ≤6°C1 | 14 days |
| Inorganic nonmetallics all except: | - | - | Glass or plastic | Cool ≤6°C1 | 28 days |
| Cyanide | - | - | Glass or plastic | Cool ≤6°C1 | 14 days |
| Sulfite, Nitrate, Nitrite, & o-phosphate | - | - | Glass or plastic | Cool ≤6°C1 | 48 hours |
| Elemental Phorsphorus | - | - | Glass or plastic | Cool ≤6°C1 | 48 hours |
| Per- and Polyfluoroalkyl Substances | LC/MS/MS | EPA 1633 | HDPE (lot-certified PFAS-free) | Cool ≤6°C for transport; ≤-20°C in dark upon receipt; Extracts ≤6°C | 90 days in dark until extraction; 90 days until analysis |

The term “residuals” include: (1) sludges of domestic origin having no specific requirements in Tables FS-1000-4 or FS-1000-9; (2) sludges of industrial origin; and (3) concentrated waste samples.

| **Conc.**  **Level** | **Sampling Device\*** | **Collection Procedure\*** | **Sample Container**  **Type\*** | **Sample Container or**  **Vial Preparation\*** | **Preservation\*** | **Sample Preparation\*** | **Max HT[[39]](#endnote-39),6\*** | **Determinative Procedure[[40]](#endnote-40)\*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ≤200 ug/kg | VOC Sample Coring Device | 5035A - Section 8.2.1 | Glass Vial w/ PTFE-silicone Septum | 5035A - Section 8.1.1 | NaHSO4 / ≤6ºC4 (see 5035A - 8.4.3) | 5035A - Section 11.2.3 | 14 D | Any recognized VOC Method (see 5035A – Section 11.2) |
| ≤200 ug/kg | VOC Sample Coring Device | 5035A - Section 8.2.1 | Glass Vial w/ PTFE-silicone Septum | 5035A - Section 8.1.1[[41]](#endnote-41) (See Appendix A, Section A.8.2.4) | ≤6ºC4 | 5035A - Section 11.2.3 | 48 H | Any recognized VOC Method (see 5035A – Section 11.2) |
| ≤200 ug/kg | VOC Sample Coring Device | 5035A - Section 8.2.1 | Glass Vial w/ PTFE-silicone Septum | 5035A - Section 8.1.13 | ≤6ºC (Reagent Water) / < -7ºC[[42]](#endnote-42),[[43]](#endnote-43) | 5035A - Section 11.2.3 | 48 H / 14 D[[44]](#endnote-44) | Any recognized VOC Method (see 5035A – Section 11.2) |
| ≤200 ug/kg | EnCore or equivalent | 5035A - Section 8.2.1 | EnCore or equivalent | 5035A – Section 8.1.13, [[45]](#endnote-45), [[46]](#endnote-46) | ≤6ºC4 | 5035A - Section 11.2.3 | 48 H | Any recognized VOC Method (see 5035A – Section 11.2) |
| ≤200 ug/kg | EnCore or equivalent | 5035A - Section 8.2.1 | EnCore or equivalent | 5035A – Section 8.1.1 7, 8 | NaHSO4 / ≤6ºC4 (see 5035A, 8.4.3) | 5035A - Section 11.2.36 | 48 H / 14 D4,6 | Any recognized VOC Method (see 5035A – Section 11.2) |
| ≤200 ug/kg | EnCore or equivalent | 5035A - Section 8.2.1 | EnCore or equivalent | 5035A – Section 8.1.13,7,8 | ≤6ºC / < -7ºC4 | 5035A - Section 11.2.36 | 48 H / 14 D4,6 | Any recognized VOC Method (see 5035A – Section 11.2) |
| >200 ug/kg | EnCore or equivalent | 5035A - Section 8.2.2.7; | EnCore or equivalent | 5035A – Section 8.1.2 & 8.1.37, 8; | ≤6ºC / Methanol10 or < -7ºC | 5035A - Section 11.36 | 48 H / 14 D6 | Any recognized VOC Method (see 5035A – Section 11.3 |
| >200 ug/kg[[47]](#endnote-47) | VOC Sample Coring Device | 5035A - Section 8.2.2.[[48]](#endnote-48) | Glass Vial w/ PTFE-silicone Septum | 5035A – Section 8.1.2 & 8.1.310 | ≤6ºC / Methanol10 or < -7ºC | 5035A - Section 11.3 | 48 H / 14 D6 | Any recognized VOC Method (see 5035A – Section 11.3) |
| >200 ug/kg9 | Conventional Devices (e.g. bulk corer, spatula or spoon) | DEP SOP FS 3000 - Section 5. | Glass w/ PTFE-silicone Septum | 5035A – Section 8.1.2 | ≤6ºC | 5035A - Section 11.3 | 14 D6 | Any recognized VOC Method (see 5035A – Section 11.3) |
| Oily Waste | Conventional Devices (e.g. bulk corer, spatula or spoon; waste samplers) | 5035A - Section 8.2.4. | Glass w/ PTFE-silicone Septum | 5035A - Section 8.1.4 | ≤6ºC | 5035A - Sections 11.4 | 14 D6 | Any recognized VOC Method (see 5035A – Section 11.4) |
| Oily Waste | Conventional Devices (e.g. bulk corer, spatula or spoon; waste samplers) | 5035A - Section 8.2.4. | Glass w/ PTFE-silicone Septum | 5035A - Section 8.1.4 | Methanol/PEG + ≤6ºC10 | 5035A - Section 11.4 | 14 D6 | Any recognized VOC Method (see 5035A – Section 11.4) |
| Dry Weight | Conventional Devices (e.g. bulk corer, spatula or spoon) | 5035A - Sections 8.2.1.6 & 8.2.2.7 | Glass with Teflon liner | 5035A – 6.4.1.1 | ≤6ºC | 5035A - Section 11.5 | Not applicable | 5035A - Section 11.5 |
| Soil Screen | Conventional Devices (e.g. bulk corer, spatula or spoon) | 5035A - Sections 8.2.1.6, 8.2.3 | Glass w/ PTFE-silicone Septum | 5035A – 6.4.1.1 | ≤6ºC | 5035A - Section 11.1 | 14 D4,6 | 5035A - Section 11.1 |

| Analyte or EPA or Standard Method Number\* | Preservation[[49]](#endnote-49) | Holding Time[[50]](#endnote-50) | Preservation and Holding Time for Extract[[51]](#endnote-51) | Container[[52]](#endnote-52) |
| --- | --- | --- | --- | --- |
| Microbiological-bacteria | Cool < 10°C, Na2S2O3[[53]](#endnote-53) | - | - | P or G |
| Total Coliforms, fecal coliforms & *E. coli* in drinking water | Cool < 10°C[[54]](#endnote-54), Na2S2O35 | 30 Hours[[55]](#endnote-55) | - | P or G |
| Total coliforms and fecal coliforms in source water  Heterotrophic bacteria in drinking water | Cool < 10°C, Na2S2O35 | 8 hours | - | P or G |
| Gross Alpha | Conc. HCl or HNO3 to pH <2 [[56]](#endnote-56),[[57]](#endnote-57) | 6 mo | - | P or G |
| Gross beta | Conc. HCl or HNO to pH <28,9 | 6 mo | - | P or G |
| Strontium-89 | Conc. HCl or HNO to pH <28,9 | 6 mo | - | P or G |
| Strontium-90 | Conc. HCl or HNO to pH <28,9 | 6 mo | - | P or G |
| Radium-226 | Conc. HCl or HNO to pH <28,9 | 6 mo | - | P or G |
| Radium-228 | Conc. HCl or HNO to pH <28,9 | 6 mo | - | P or G |
| Cesium-134 | Concentrated HCl to pH <<28,9 | 6 mo | - | P or G |
| Iodine-131 | None | 8 days | - | P or G |
| Tritium | None | 6 months | - | G |
| Uranium | Conc. HCl or HNO3 to pH <28,9 | 6 mo | - | P or G |
| Photon emitters | Conc. HCl or HNO3 to pH <28,9 | 6 mo | - | P or G |
| Asbestos | Cool 4°C | 48 hours | - | P or G |
| Bromate | Ethylenediamine (50mg/L) | 28 days | - | P or G |
| Cyanide | Ascorbic acid (if chlorinated) then, NaOH pH>12, Cool, 4°C, | 14 days | - | P or G |
| Nitrate | Cool, 4°C | 48 hours | - | P or G |
| Nitrate (chlorinated source) | Cool, 4°C | 14 days | - | P or G |
| Odor | Cool 4°C | 24 hours | - | G |
| Method 502.2 Volatile Organic Compounds | Sodium Thiosulfate or Ascorbic Acid, then HCl pH<2, Cool 4°C | 14 days | - | Glass with PFTE Lined Septum |
| EPA Method 504.1 1,2-Dibromoethane (EDB), 1,2-Dibromo-3-Chloro-Propane (DBCP), and  1,2,3-Trichloropropane (123TCP) | Cool, 4°C, | 14 days | 4°C, 24 hours | Glass with PFTE-Lined Septum |
| EPA Method 505 Organohalide Pesticides and Commercial Polychlorinated Biphenyl (PCB) | Sodium Thiosulfate Cool, 4°C | 14 days (7 days for Heptachlor) | 4°C, 24 hours | Glass with PFTE-Lined Septum |
| EPA Method 506 Phthalate and Adipate Esters | Sodium Thiosulfate Cool, 4°C, Dark | 14 days | 4°C, dark, 14 days | Amber Glass with PFTE-lined Cap |
| EPA Method 507 Nitrogen- and Phosphorus-Containing Pesticides | Sodium Thiosulfate Cool, 4°C, Dark | 14 days (see method for exceptions) | 4°C, dark, 14 days | Amber Glass with PFTE-lined Cap |
| EPA Method 508 Chlorinated Pesticides | Sodium Thiosulfate Cool, 4°C, Dark | 7 days (see method for exceptions) | 4°C, dark, 14 days | Glass with PFTE-lined Cap |
| EPA Method 508A Polychlorinated Biphenyls | Cool, 4°C | 14 days | 30 days | Glass with PFTE-lined Cap |
| EPA Method 508.1 Chlorinated Pesticides, Herbicides, and Organohalides | Sodium Sulfite then HCl pH<2, Cool, 4°C | 14 days (see method for exceptions) | 30 days | Glass with PFTE-lined Cap |
| EPA Method 515.1 Chlorinated Acids | Sodium Thiosulfate Cool, 4°C, Dark | 14 days | 4°C, dark, 28 days | Amber Glass with PFTE-lined Cap |
| EPA Method 515.2 Chlorinated Acids | Sodium Thiosulfate HCl pH<2, Cool, 4°C, Dark | 14 days | ≤ 4°C, dark, 14 days | Amber Glass with PFTE-lined Cap |
| EPA Method 515.3 Chlorinated Acids | Sodium Thiosulfate, Cool, 4°C, Dark | 14 days | ≤ 4°C, dark, 14 days | Amber Glass with PFTE-lined Cap |
| EPA Method 515.4 Chlorinated Acids | Sodium Sulfite, , Cool, ≤10°C for first 48 hours ≤6°C thereafter, Dark | 14 days | ≤0°C, 21 days | - |
| EPA Method 524.2 Purgeable Organic Compounds | Ascorbic Acid, HCl pH<2, Cool 4°C | 14 days | - | Glass with PFTE-lined Septum |
| EPA Method 525.2 Organic Compounds | Sodium Sulfite, then HCl pH<2 Dark, Cool, 4°C | 14 days (see method for exceptions) | ≤ 4°C, 30 days from collection | Amber Glass with PFTE-lined Cap |
| EPA Method 531.1 N-Methylcarbamoyloximes and N-Methylcarbamates, and Method  Standard Method 6610 Carbamate Pesticides | Sodium Thiosulfate Monochloroacetic acid, pH<3, Cool, 4°C | Cool 4°C, 28 days | - | Glass with PFTE-lined Septum |
| EPA Method 531.2 N-Methylcarbamoyloximes and N-Methylcarbamates | Sodium Thiosulfate then Potassium Dihydrogen Citrate buffer to pH 4, dark, ≤10°C for first 48 hr, ≤6°C thereafter | 28 days | - | - |
| EPA Method 547 Glyphosate | Sodium Thiosulfate Cool, 4°C | 14 days (18 mo. frozen) | - | Glass with PFTE-lined Septum |
| EPA Method 548.1 Diquat and Paraquat | Sodium Thiosulfate (then HCl pH 1.5-2 if high biological activity), Cool, 4°C, Dark | 7 days | ≤4°C 14 days | Amber Glass with PFTE-lined Septum |
| EPA Method 549.2 Diquat and Paraquat | Sodium Thiosulfate (H2SO4 pH<2 if biologically active), Cool, 4°C, Dark | 7 days | 21 days | High Density Amber Plastic or Silanized Amber Glass |
| EPA Methods 550 and 550.1 Polycyclic Aromatic Hydrocarbons | Sodium Thiosulfate Cool, 4°C, HCl pH<2 | 7 days | 550, 30 days 550.1, 40 days  Dark, 4°C | Amber Glass with PFTE-lined Cap |
| EPA Method 551.1 Chlorination Disinfection Byproducts, Chlorinated Solvents, and Halogenated Pesticides/Herbicides | Sodium Thiosulfate, Sodium Sulfite, Ammonium Chloride, pH 4.5-5.0 with phosphate buffer, Cool, 4°C | 14 days | - | Glass with PFTE-lined Septum |
| EPA Method 552.1 Haloacetic Acids and Dalapon | Ammonium chloride, Cool, 4°C, Dark | 14 days | ≤4°C, dark 48 hours | Amber Glass with PFTE-lined cap |
| EPA Method 552.2 Haloacetic Acids and Dalapon | Ammonium chloride, Cool, 4°C, Dark | 14 days | ≤4°C, dark 7 days  ≤-10°C 14 days | Amber Glass with PFTE-lined cap |
| EPA Method 552.3 Haloacetic Acid and Dalapon | Ammonium chloride, Cool, 6°C, Dark | 14 days | MTBE, 21 days  TAME, 28 days  ≤-10°C in dark | Amber Glass with PFTE-lined cap |
| EPA Method 555 Chlorinated Acids | Sodium Sulfite, HCl, pH ≤ 2, Dark, Cool 4°C | 14 days | - | Glass with PFTE-lined cap |
| EPA Method 1613B Dioxins, tetra- thru octa- (CDDs) & Furans (CDFs) | Sodium Thiosulfate, Cool, 0-4°C, Dark | - | Recommend 40 days | Amber Glass with PFTE-lined Cap |
| EPA Method 537.1 Per- and Polyfluoroalkyl Substances, Version 2.0 | Trizma®, pH 7.0, 5.0g/L.  Cool ≤10°C during transport. Keep at lab ≤6°C until extraction, never freeze | 14 days until extraction | 28 days after extraction | Polypropylene |
| EPA Method 533 Per- and Polyfluoroalkyl Substances | Ammonium acetate to 1g/L; Cool ≤10°C during transport. Keep at lab ≤6°C until extraction, never freeze | 28 days until extraction | 28 days after extraction | Polypropylene, Polyethylene (PFAS-free) |

Table FS 1000-9

Containers, Preservation and Holding Times for Biosolids Samples and Protozoans

| ***ANALYTE NAME*** | ***CONTAINER*** | ***PRESERVATION*** | ***MAX HOLDING TIME*** |
| --- | --- | --- | --- |
| Fecal Coliform | Plastic or Glass | Cool 4°C | 24 hours |
| Salmonella | Plastic or Glass | < 10°C | 24 hours |
| Enteric Viruses | Plastic or Glass | Up to 25°C | 2 hours |
| Enteric Viruses | Plastic or Glass | 2 to 10°C | 48 hours |
| Specific Oxygen Uptake Rate | Plastic or Glass | None | As Soon As Possible |
| Helminth OVA | Plastic or Glass | < 4°C (Do not Freeze) | 24 hours |
| Cryptosporidium/Giardia | Plastic or Glass | 0 - 10°C (Do not Freeze)\* | 96 Hours |
| Total Solids | Plastic or Glass | ≤6°C (Do not Freeze) | 7 days |
| Metallics | Plastic or Glass | \*\* | \*\* |
| Other Inorganic Pollutants | Plastic or Glass | \*\* | \*\* |
| Per- and Polyfluoroalkyl Substances | Plastic (certified PFAS-free) | ≤6°C (Do not Freeze) until receipt; ≤-20°C in dark upon receipt and after extraction | 90 days in dark until extraction; 90 days from extraction to analysis |

\*Dechlorinate bulk samples when applicable

\*\*See Tables FS 1000-4, FS 1000-5, and FS 1000-6

Table FS 1000-10

Container Materials, Preservation, and Holding Times for Fish and Shellfish

| **Analyte** | **Matrix** | **Sample Container** | **Field**  **Preservation** | **Maximum Shipping Time (Transport to Lab)** | **Laboratory**  **Storage** | **Laboratory Holding Time** |
| --- | --- | --- | --- | --- | --- | --- |
| -- | Whole Organism (Fish, shellfish, etc.) | Foil-wrap each organism (or composite for shellfish) and transport in waterproof plastic bag | Cool in wet ice  or  Freeze on dry ice | 24 hours  or  48 hours | - | - |
| Mercury | Tissue (fillets and edible portions, homogenates) | Plastic, borosilicate glass, quartz, PTFE | Cool in wet ice  or  Freeze on dry ice | 24 hours  or  48 hours | Freeze at <-20°C | 1 year |
| Other metals | Tissue (fillets and edible portions, homogenates) | Plastic, borosilicate glass, quartz, PTFE | Cool in wet ice  or  Freeze on dry ice | 24 hours  or  48 hours | Freeze at <-20°C | 6 months |
| Organics | Tissue (fillets and edible portions, homogenates) | Borosilicate glass, PTFE, quartz, aluminum foil | Cool in wet ice  or  Freeze on dry ice | 24 hours  or  48 hours | Freeze at <-20°C | 1 year |
| Dioxin | Tissue (fillets and edible portions, homogenates) | Amber containers: Borosilicate glass, PTFE, quartz, aluminum foil | Cool in wet ice  or  Freeze on dry ice | 24 hours  or  48 hours | Freeze at <-20°C | 30 days until extraction, 15 days after extraction |
| Lipids | Tissue (fillets and edible portions, homogenates) | Plastic, borosilicate glass, quartz, PTFE | Cool in wet ice  or  Freeze on dry ice | 24 hours  or  48 hours | Freeze at <-20°C | 1 year |
| Per- and Polyfluoroalkyl Substances | Whole Organism (Fish, shellfish, etc.) | Plastic or Foil-wrap (Certified PFAS-free) | Cool in wet ice  or  Freeze on dry ice | 24 hours  or  48 hours | Freeze at <-20°C in dark | 90 days in dark until extraction; 90 days after extraction |

PTFE = Polytetrafluoroethylene (Teflon)

Table FS 1000-11

Holding Times for SPLP or TCLP Extraction, Sample Preparation and Determinative Analysis

| Analyte | **From: Field Collection**  **To: SPLP or TCLP Extraction** | **From: SPLP or TCLP Extraction**  **To: Preparative Extraction** | **From: Preparative Extraction**  **To: Determinative Analysis** | **Total Elapsed Time** |
| --- | --- | --- | --- | --- |
| Volatiles | 14 | NA | 7/14\* | 21/28\* |
| Semi-Volatiles | 14 | 7 | 40 | 61 |
| Mercury | 28 | NA | 28 | 56 |
| Metals, except Mercury | 180 | NA | 180 | 360 |

Holding Time in days.

NA – Not Applicable

\*longer holding time if sample extract is adjusted to a pH of 2

Table FS 1000-12

Preventive Maintenance Tasks

| **Instrument** | **Activity** | **Frequency** |
| --- | --- | --- |
| Refrigerators, Incubators, Ovens | Clean interior | Monthly |
| Refrigerators, Incubators, Ovens | Check thermometer temperature against certified thermometer or equivalent | Annually |
| Analytical Balances | Clean pan and compartment | Daily1 |
| Analytical Balances | Check with Class S weights | Monthly |
| Analytical Balances | Manufacturer cleaning and calibration | Annually |
| pH and Ion Selective Electrodes – Probe | Check probe for cracks and proper levels of filling solution; check reference junction; clean electrode | Daily, Replace as necessary |
| pH and Ion Selective Electrodes – Probe | Check response time | Daily1 |
| pH and Ion Selective Electrodes – Meter | Check batteries and electronics for loose connections and cracked leads | Daily1, Replace as necessary |
| Turbidimeter | Clean instrument housing | Monthly |
| Turbidimeter | Clean cells | Daily1 |
| Conductivity Meter | Check batteries and probe cables | Daily1 |
| Conductivity Meter | Replatinize probe | Per manufacturer’s recommendations |
| Dissolved Oxygen Meters – Probe | Check membrane for deterioration; check filling solution | Daily1, Replace as necessary |
| Dissolved Oxygen Meters – Meter | Battery level and electronics checked | Daily1, Replace as necessary |
| Thermometers | Check for cracks and gaps in the mercury | Daily1, Replace as necessary |
| Temperature Probe | Check connections, cables | Daily1 |
| Temperature Probe | Check against calibrated thermometer | Daily1 |
| Automatic Sample Collection Systems (e.g., ISCO, Sigma) | Check sampler operation (forward, reverse, automatic through three cycles of the purge-pump-purge cycle) | Daily1, Prior to Sampling Event |
| Automatic Sample Collection Systems (e.g., ISCO, Sigma) | Check purge-pump-purge cycle when sampler is installed | Daily1, Prior to Sampling Event |
| Automatic Sample Collection Systems (e.g., ISCO, Sigma) | Check the flow pacer that activates the sampler to assure proper operation | Daily1, Prior to Sampling Event |
| Automatic Sample Collection Systems (e.g., ISCO, Sigma) | Check desiccant | Daily1, Replace as Necessary |
| Automatic Sample Collection Systems (e.g., ISCO, Sigma) | Check batteries | Daily1, Replace as Necessary |
| Automatic Sample Collection Systems (e.g., ISCO, Sigma) | Check pumping rate against manufacturer’s specifications | Daily1, Replace as Necessary |

1Daily is defined as prior to use or a 12-hour period if equipment is run continuously.

1. 1 Refers to construction material of the portions of the sampling equipment that come in contact with the sample (e.g., housing of variable speed submersible pump must be stainless steel if extractable organics are sampled; the housing of a variable speed submersible pump used to sample metals may be plastic.) [↑](#endnote-ref-1)
2. 2 Specific container limitations for an individual analyte or parameter outlined in Tables FS 1000-3, FS 1000-4, FS 1000-5, and FS 1000-6 supersede the general considerations for an analyte group given in Table FS 1000-1. [↑](#endnote-ref-2)
3. 3 Corroded/weathered surfaces are active sorption sites for organic compounds. [↑](#endnote-ref-3)
4. 4 Plastics used in connection with inorganic trace element samples (including metals) must be uncolored or white. [↑](#endnote-ref-4)
5. 5 May be allowable for specialized parts where no alternative material exists (e.g., Viton seals are the best available seal for some dedicated pump systems), however, contact with the sample must be minimized. [↑](#endnote-ref-5)
6. 1 Specific container limitations for an individual analyte or parameter outlined in Tables FS 1000-3, FS 1000-4, FS 1000-5, and FS 1000-6 supersede the general considerations for an analyte group given in Table FS 1000-2. [↑](#endnote-ref-6)
7. 1 Refers to tubing and pump housings/internal parts that are in contact with purged or sampled water (interior and exterior of delivery tube, inner lining of the discharge tube, etc.). [↑](#endnote-ref-7)
8. 2 If used to collect volatile or extractable organics, all power cords and other tubing must be encased in Teflon, PE or PP. [↑](#endnote-ref-8)
9. 3 If used as a non-dedicated system, pump must be completely disassembled, if practical, and cleaned between wells. [↑](#endnote-ref-9)
10. 4 Delivery tubing must be precleaned and precut at the base of operations or laboratory. If the same tubing is used during the sampling event, it must be cleaned and decontaminated between uses. [↑](#endnote-ref-10)
11. 5 In-line check valve required. [↑](#endnote-ref-11)
12. 6 “Non-inert” pertains to materials that are reactive (adsorb, absorb, etc.) to the analytes being sampled. For organics, materials include rubber (except silicone) and plastics (except PE, PP, and PVC). For metals, materials include brass, galvanized, and carbon steel and exclude stainless steel. [↑](#endnote-ref-12)
13. 7 “Polishing”: When purging for volatile or extractable organics, the entire length of tubing or the portion which comes in contact with the formation water must be constructed of Teflon, SS, PE or PP. If other materials (e.g., PVC, garden hoses, etc.) are used, the following protocols must be followed: 1) slowly withdraw the pump from the water column during the last phase of purging, to remove any water from the well that may have contacted the exterior of the pump and/or tubing; 2) remove a single well volume with the sampling device before sampling begins. **Do not use Tygon** for purging if purgeable or extractable organics are of interest. Polishing **is not recommended;** use of sampling equipment constructed of appropriate materials is preferred. [↑](#endnote-ref-13)
14. 8 Do not use if collecting for hexavalent chromium (Chromium+6). [↑](#endnote-ref-14)
15. 9 If samples are sealed in the liner for transport to the laboratory, the sample for VOC analysis must be taken from the interior part of the core. [↑](#endnote-ref-15)
16. 10 If a non-stainless steel (carbon steel, aluminum) liner, core barrel or implement is used, take the samples for metals, purgeable organics and organics from the interior part of the core sample. [↑](#endnote-ref-16)
17. 11 Aluminum foil, trays or liners may be used only if aluminum is not an analyte of interest. [↑](#endnote-ref-17)
18. 12 If non-inert-liner, core barrel or implement is used, take samples from the interior part of the collected sample. [↑](#endnote-ref-18)
19. 13 If disposable equipment of alternative construction materials is used, the construction material must be compatible with the chemical composition of the waste, cannot alter the characteristics of the waste sample in any way, and cannot contribute analytes of interest or any interfering components. [↑](#endnote-ref-19)
20. 14 LDPE may not be used for pump tubing when collecting VOCs or PFAS. [↑](#endnote-ref-20)
21. 1 SM XXXX = procedures from "Standard Methods for the Examination of Water and Wastewater"; see Standard Methods Online (http://www.standardmethods.org/store/). Reference methods are listed for informational purposes only.

    ASTM XXXX-YY = procedure from "Annual Book of ASTM Standards", Water and Environmental Technology, Volumes 11.01 and 11.02 (Water I and II). See American Society for Testing and Materials (ASTM International), <http://www.astm.org/Standard/index.shtml>. Reference methods are listed for informational purposes only. [↑](#endnote-ref-21)
22. 2 P = plastic, G = glass, FP= fluoropolymer (polytetrafluoroethylene (PTFE; Teflon®), or other fluoropolymer, SS= stainless steel, HDPE= high-density polyethylene, PE=polyethylene, PVC= polyvinyl chloride, PP= polypropylene, N/A=not applicable. [↑](#endnote-ref-22)
23. 3 When specified, sample preservation should be performed immediately upon sample collection. [↑](#endnote-ref-23)
24. 4 The times listed are the maximum times that samples may be held before analysis and still be considered valid. [↑](#endnote-ref-24)
25. 5 The approved procedure is for residual chlorine. However, in the absence of chlorine, the DPD colorimetric procedure can be adapted to measure bromine content of the sample. In such case, the validity of this assumption must be verified by using another procedure for chlorine which is not affected by the presence of bromine (i.e., negligible interference). [↑](#endnote-ref-25)
26. 6 “The Determination of Inorganic Anions in Water by Ion Chromatography", EPA Method 300.0, Revision 2.1, Revised August 1993, by John D. Pfaff, U. S. EPA Cincinnati, Ohio 45268. Reference methods are listed for informational purposes only. [↑](#endnote-ref-26)
27. 7 Collect samples in opaque bottles and process under reduced light. A secondary device, such as a Van Dorn/Niskin or bucket, may be used to collect the sample and then expeditiously transfer into an opaque bottle. [↑](#endnote-ref-27)
28. 8 Samples must be filtered within 48 hours of collection. Add magnesium carbonate to the filter while the last of the sample passes through the filter. [↑](#endnote-ref-28)
29. 9 Temperature and pH must be measured on site at the time of sample collection. 7 days is the maximum time for laboratory analysis of total alkalinity, calcium ion and total solids. [↑](#endnote-ref-29)
30. 10 The electrometric and hydrometric analytical methods are suited for field use. The argentometric method is suited for laboratory use. Samples collected for laboratory analysis, when properly sealed with paraffin waxed stopper, may be held indefinitely. The maximum holding time of 30 days is recommended as a practical regulatory limit. [↑](#endnote-ref-30)
31. 11 Transparency in surface waters is defined as a compensation point for photosynthetic activity, i.e., the depth at which one percent of the light intensity entering at the water surface remains unabsorbed. The DEP Chapter 62-302, FAC requires that the light intensities at the surface and subsurface be measured simultaneously by irradiance meters such as the Kahlsico Underwater Irradiometer, Model No. 268 WA 310, or an equivalent device having a comparable spectral response. [↑](#endnote-ref-31)
32. 12 The results of the measurements of pH, temperature, salinity (if applicable) and the ammonium ion concentration in the sample are used to calculate the concentration of ammonia in the unionized state. Temperature, pH and salinity must be measured on-site at the time of sample collection. Laboratory analysis of the ammonium ion concentration should be conducted within eight hours of sample collection. If prompt analysis of ammonia is impossible, preserve samples with H2SO4 to pH between 1.5 and 2. Acid-preserved samples, stored at 4°C, may be held up to 28 days for ammonia determination. Sodium thiosulfate should only be used if fresh samples contain residual chlorine. [↑](#endnote-ref-32)
33. 13 Calculation of Un-ionized Ammonia in Fresh Water, Chemistry Laboratory Methods Manual, Florida Department of Environmental Protection, Revision 2, 2/12/2001. The document is available from the DEP Standards & Assessment Section. Reference method listed for informational purposes only. [↑](#endnote-ref-33)
34. 14 Other pesticides listed in approved EPA methods (608.1, 608.2, 614, 614.1, 615, 617, 618, 619, 622, 622.1, 627, 629, 631, 632, 632.1, 633, 642, 643, 644 and 645) that are not included in Table ID of 40 CFR Part 136.3 (7-1-13 Edition). Reference methods and CFR citation listed for informational purposes only. [↑](#endnote-ref-34)
35. 15 Container, preservation and holding time as specified in each individual method must be followed. [↑](#endnote-ref-35)
36. 16 Sample preservation procedures, container material and maximum allowable holding times for analytes not specified in DEP-SOP-001/01 (January 2017) shall follow the preservation, container and holding time requirements specified in the selected analytical method. If no method-specified requirements exist, the best available scientific knowledge shall be used as guidance for determining the appropriate procedures for use, per 62-160.400(2), F.A.C.

    17 Method 1664, n-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated n-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry. Revision A, February 1999. EPA-821-R-98-002, and, Revision B, February 2010. EPA-821-R-10-001. Reference methods listed for informational purposes only.

    18 FL-PRO - Method for Determination of Petroleum Range Organics, Revision 2, November 2, 2018, Florida Department of Environmental Protection. [↑](#endnote-ref-36)
37. 1 Keep soils, sediments and sludges cool at ≤6°C from collection time until analysis. No preservation is required for concentrated waste samples. [↑](#endnote-ref-37)
38. 2 Storage Temperature is 4°C, ±2°C

    \* Reference method numbers are listed for informational purposes only and are found in SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (<https://www.epa.gov/hw-sw846/sw-846-compendium>) except for the additional informational method sources listed below:

    FL-PRO - Method for Determination of Petroleum Range Organics, Revision 1, November 1, 1995, Florida Department of Environmental Protection

    MADEP – Method for the Determination of Extractable Petroleum Hydrocarbons (EPH), Revision 1.1, May 2004, Massachusetts Department of Environmental Protection

    MPN – Microbiological test methods utilizing Most Probable Number procedures

    TPHWG - TPH Working Group Series [↑](#endnote-ref-38)
39. 1 Maximum holding time allowable from time/date of collection to sample analysis. H=Hours, D=Days [↑](#endnote-ref-39)
40. 2 See 62-160.320, F.A.C., Approved Laboratory Methods. [↑](#endnote-ref-40)
41. 3 Eliminate 8.1.1.2; use only organic-free water (when applicable). [↑](#endnote-ref-41)
42. 4 Samples in glass vials must be frozen onsite or transported at ≤6ºC, analyzed within 48 hours if not frozen, or frozen at the laboratory within 48 hours, stored at < -7ºC. Organic-free reagent water may be added to the sample vial before sample collection or upon receipt at the laboratory before freezing within 48 hours. Samples in Encore or equivalent devices must be transported at ≤6ºC, analyzed within 48 hours if not frozen, or extruded into glass vials at the laboratory and frozen within 48 hours at < -7ºC. Do not freeze at less than -20ºC. Frozen samples stored in Encore or equivalent devices may only be held for 48 hours. Frozen samples in glass vials may be held up to 14 days from the day of sample collection. Samples collected in or transferred to glass vials preserved with NaHSO4/organic-free reagent water solution may be held up to 14 days from the day of sample collection without freezing, and is only recommended for aromatic VOCs, such as benzene, ethylbenzene, toluene and xylenes (“BTEX”). Additional bisulfate solution may be needed for alkaline soils. Do not preserve carbonate soils with the bisulfate/water solution, or when reactive compounds in the sample are suspected, such as 2-chloroethyl vinyl ether, which may be lost in acidic conditions. The sodium chloride matrix modifying reagent of Method 5021 was found to be as effective as NaHSO4 for inhibiting biodegradation of aromatic hydrocarbons in soil and may be more advantageous to use with calcareous soils. NOTE: Biologically active soils may require immediate chemical preservation or freezing to reduce the loss of aromatic VOCs. [↑](#endnote-ref-42)
43. 5 In order to ensure that vials do not break during freezing, store vials horizontally (on the side) or at a slanted angle to maximize surface area. [↑](#endnote-ref-43)
44. 6 Maximum allowable time at ≤6ºC is 48 hours; when applicable, maximum allowable time to sample analysis is 14 days (from time of sample collection) if sample in glass vial is preserved with methanol or frozen with 48 hours of sample collection. Methanolic extracts of samples may be stored up to 14 days at ≤6ºC. [↑](#endnote-ref-44)
45. 7 Conducted in the laboratory. [↑](#endnote-ref-45)
46. 8 Entire contents of sampling device are extruded into the sample analysis vial containing the appropriate solvent (when applicable). [↑](#endnote-ref-46)
47. 9 Procedures are limited only to those situations or programs in which the maximum contamination level exceeds 200 ug/kg. [↑](#endnote-ref-47)
48. 10 Methanolic preservation in the field is not recommended, but may be used if approved by DEP for a project. Do not preserve oily waste samples of unknown solubility with methanol or PEG. The sample may be transported in ice at ≤6ºC and preserved with methanol upon receipt at the laboratory within 48 hours to allow the 14-day holding time. Samples in Encore or equivalent coring devices must be extruded into glass vials to preserve with methanol upon laboratory receipt. Samples must be analyzed within 48 hours if not preserved with methanol. NOTE: Biologically active soils may require immediate chemical preservation or freezing to reduce the loss of aromatic VOCs, such as benzene, ethylbenzene, toluene and xylenes.

    \*See additional information in method 5035A, July 2002 (including information in Appendix A), in SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (<https://www.epa.gov/hw-sw846/validated-test-methods-recommended-waste-testing>)) and DEP SOP FS 3000, Soil, in DEP-SOP-001/01, January 2017. [↑](#endnote-ref-48)
49. 1 Preservation, when required, must be done immediately upon sample collection. [↑](#endnote-ref-49)
50. 2 Stated values are the maximum regulatory holding times. Sample processing must begin by the stated time. [↑](#endnote-ref-50)
51. 3 Stated time is the maximum time a prepared sample extract may be held before analysis. [↑](#endnote-ref-51)
52. 4 (P) polyethylene or (G) or glass. For microbiology, plastic sample containers must be made of sterilizable materials (poly-propylene or other autoclavable plastic). [↑](#endnote-ref-52)
53. 5 Addition of sodium thiosulfate is only required if the sample has a detectable amount of residual chlorine, as indicated by a field test using EPA Method 330.4 or 330.2 or equivalent. [↑](#endnote-ref-53)
54. 6 Temperature requirement applies only to source water samples, however once received by the laboratory, if sample processing does not begin on the same working day, samples must be refrigerated. [↑](#endnote-ref-54)
55. 7 If samples are analyzed after 30 hours, but within 48 hours of collection, the laboratory is to indicate in the analytical report that the data may be invalid because of excessive delay in sample processing. No samples received after 48 hours are to be accepted or analyzed for compliance with the regulations of the Department of Environmental Protection or the Department of Health. [↑](#endnote-ref-55)
56. 8 It is recommended that the preservative be added at the time of collection unless suspended solids activity is to be measured. It is also recommended that samples be filtered, if suspended or settleable solids are present, prior to adding preservative, at the time of collection. However, if the sample has to be shipped to a laboratory or storage area, acidification of the sample (in its original container) may be delayed for a period not to exceed 5 days. A minimum of 16 hours must elapse between acidification and analysis. [↑](#endnote-ref-56)
57. 9 If HCl is used to acidify samples, which are to be analyzed for gross alpha or gross beta activities, the acid salts must be converted to nitrate salts before transfer of the samples to planchets.

    \*EPA or Standard Method numbers are provided as informational references only. [↑](#endnote-ref-57)