

## SUPPLIES FOR EQUIPMENT CLEANING 3.1

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The supplies commonly used to clean sample-collection and sample-processing equipment are listed in table 3-1. Cleaning supplies are to be stored in a contaminant-free cabinet. Follow safety instructions regarding the storage of chemical reagents (NFM 9).

Before gathering the cleaning supplies, check the construction materials (for example, metal, glass, or plastic) of washbasins and other cleaning items relative to the samples to be collected.

- ▶ For analysis of inorganic constituents—Basins, brushes, and other items used for cleaning should be constructed of a suitable nonmetallic material such as uncolored or white polypropylene, polyethylene, or other plastic. Do not use cleaning agents or items that might leach or sorb metals if the equipment to be cleaned will be used for samples to be analyzed for trace elements.
- ▶ For analysis of organic compounds—Basins and other cleaning items can be constructed of metal, glass, or plastic materials. Stainless steel is recommended if methanol will be used. Do not use cleaning agents or items that might leach, sorb, or leave residues of organic substances that could bias or interfere with the analysis.

**CAUTION:** Refer to Material Safety Data Sheets (MSDS) before handling any chemicals.

- Wear appropriate safety gloves, glasses, and apron when working with corrosive and oxidizing solutions.
- When using chemicals, work in a well-ventilated area.

## 12—CLEANING OF EQUIPMENT FOR WATER SAMPLING

Table 3-1. Supplies for cleaning equipment used for water-sampling activities

[ACS, American Chemical Society; DIW, distilled/deionized water;  $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; PBW, pesticide-grade blank water; VBW, volatiles and pesticide-grade blank water; IBW, inorganic-grade blank water; L, liter; cm, centimeter; TOC, total organic carbon; DOC, dissolved organic carbon; SOC, suspended organic carbon; NFM, *National Field Manual*; PVC, polyvinyl chloride; IBW, inorganic-grade blank water]

Item	Description and Comments
Acid solution <sup>1</sup>	Hydrochloric: ACS trace-element grade (5 percent by volume in DIW). Nitric: ACS trace-element grade (10 percent by volume in DIW).
Aluminum foil	Organics only: Heavy duty, for work surfaces and equipment.
Bags, plastic or fluorocarbon polymer	Sealable bags with uncolored closure strips, various sizes. Recyclable trash bags are recommended for large equipment storage.
Noncolored plastic sheeting	Clean sheeting used to provide a clean work surface.
Brushes and sponges	Uncolored; plastic components needed for inorganic work.
Distilled/deionized water (DIW)	Maximum specific electrical conductance, 1 $\mu\text{S}/\text{cm}$ (usually District produced; Office of Water Quality Memorandum 92.01).
Office-produced organic-grade deionized water	Usable only as a cleaning solution and only as specified in the text. Must not be used to substitute for PBW or VBW. <sup>2</sup>
Detergent	Nonphosphate laboratory soap (for example, Liquinox™).
Gloves, disposable	Powderless, noncolored vinyl, latex, or nitrile (latex or nitrile for use with methanol), assorted sizes.
Inorganic-grade blank water (IBW) <sup>2</sup>	Blank water with certificate of analysis prepared and (or) quality assured by the analyzing laboratory. IBW is required for blank samples.
Jerricans or carboys	For waste solutions and as neutralization container. Neutralization container: 25- to 30-L, polyethylene, wide-mouth, with layer of marble chips. Methanol waste container: Appropriate for flammable liquid.
Methanol	ACS pesticide grade. Methanol is the organic solvent in common use for equipment cleaning, but study requirements might dictate use of a different ACS pesticide-grade solvent.
Neutralization materials	Marble landscape chips (1- to 2-cm chips recommended). <sup>3</sup>
Pesticide-grade blank water (PBW) <sup>2</sup> ; volatile-grade blank water (VBW) <sup>2</sup>	Blank water prepared and (or) quality assured by the analyzing laboratory; required for collecting blank samples as follows: PBW for pesticide analysis; VBW for volatile compounds analysis and pesticide analysis; and either PBW or VBW for TOC, DOC, and SOC analyses.
Safety equipment and guidelines (NFM 9)	For example, Material Safety Data Sheets (MSDS), safety glasses, chemical spill kit, apron, emergency phone numbers.

Table 3-1. Supplies for cleaning equipment used for water-sampling activities—*Continued*

Item	Description and Comments
Standpipes for submersible pump	Plastic, glass, or other suitable material; for example, pipette jars or capped PVC casing; one standpipe labeled for blank water and one each for each cleaning solution. (Do not use PVC for methanol.)
Tapwater	If quality is questionable, substitute DIW. Tapwater is more effective for initial and rapid removal of detergent residue.
Tissues	Laboratory grade, lint free, various sizes (for example, Kimwipes™).
Washbasins	One washbasin for each cleaning solution; white or uncolored. Plastic, nonleaching. (Stainless steel is required for methanol.)
Wash bottles (dispenser or squeeze)	Labeled to indicate contents (for example, ACID, DIW, TAP). Fluorocarbon polymer needed for methanol, PBW, VBW, and IBW.

<sup>1</sup>Hydrochloric acid is required if analyzing for nitrogen species; otherwise, nitric acid is acceptable.

<sup>2</sup>PBW and VBW can be obtained from the USGS National Water Quality Laboratory (NWQL). IBW can be obtained from the USGS Quality of Water Service Unit.

<sup>3</sup>Agricultural limestone, soda ash, baking soda, and crushed shells are not recommended (Horowitz and others, 1994).

**CAUTION:** Methanol is extremely flammable and potentially explosive, emits noxious fumes, and is absorbed through the skin. Observe safety practices when handling methanol or other organic solvents.

- Wear safety gloves, glasses, and apron.
- Work in a well-ventilated area and away from an open flame or sparks.
- Make sure that all electrically powered equipment is grounded; alternating current equipment must have a ground-fault interrupter.
- Inspect electrical wiring for cuts, breaks, or abrasions where the metal wire is exposed.
  - Exposed wires can cause sparks if a short to ground occurs.
  - Replace faulty wires—do not rely on fixing with electrical tape.

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