

LISTS OF EQUIPMENT AND SUPPLIES 2.4

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Checklists of the equipment and supplies commonly used to collect and process water samples are provided in the tables that follow (tables 2-9 through 2-15) to aid field personnel in selecting equipment needed to prepare for a water-quality field trip. These lists are not exhaustive and should be modified to meet specific study needs. Many of the items listed are explained in greater detail in other NFM chapters, as indicated. Refer to other chapters of this *National Field Manual* series for lists of equipment and supplies for field measurements (NFM 6), biological indicators (fecal indicator bacteria, NFM 7), and bottom-material samples (NFM 8). Equipment must be cleaned and tested before field work begins (NFM 3).

Don't forget backup equipment.

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Table 2-9. Support equipment for surface-water sampling

[A detailed description of the various types of support equipment is beyond the scope of this manual; refer to Corbett and others (1943), Buchanan and Somers (1969), and Rantz and others (1982).]

Cranes						
✓	Type	Sampler maximum recommended weight (pounds)				
	Type A	100				
	Type E	Heavier than for type A				
	Bridge board	50				
	Other					
Crane Bases						
✓	Type	Sampler maximum recommended weight (pounds)				
	Three-wheel	100				
	Four-wheel	150				
Miscellaneous						
✓	Battery or hydraulic power motor system for B-56 or E-53 reel					
	Hanger bars, connectors, and pins for connecting sampler to cable					
	Counterweights for four-wheel crane base					
	Safety equipment (flotation jacket, cable cutter, traffic cones, and warning signs)					
	Other					
Reels						
✓	Reel	Cable diameter (inches)	Maximum weight (pounds)	Cable capacity (feet)	Brake	Operation type
	A-55	0.084	50	95	No	Hand
		.10	100	80		
	B-56	.10	150	144	Yes	Hand or power
		.125	200	115		
	E-53	.10	150	206	Yes	Power
		.125	300	165		
	Other					

NOTE: Selection of type of reel should be based largely on maximum cable length needed and weight of sampler that must be supported.

Table 2-10. Support equipment for ground-water sampling

✓	Ground-water support equipment
	Handline or manual/power reel with line
	Tripod assembly with manual or power reel
	Wellhead guide for flexible sample line to pump
	Wheeled carts to transport portable sampling equipment
	Energy source for reels and pumps (batteries, compressor, or generator)
	Other

Table 2-11. Sample-collection equipment for (A) surface water and (B) ground water

[NFM, *National Field Manual for the Collection of Water-Quality Data*]

✓	(A) Surface-water-quality sample collection (refer to NFM 4)
	Weighted bottle and handline (plastic or stainless steel) bottle
	US DH-81 (handle and collar) Nylon or fluorocarbon polymer nozzle ¹ (3/16, 1/4, or 5/16 inch) and cap Plastic or fluorocarbon polymer bottle (0.5 or 1 liter)
	US D-77 (plastic dipped) Bottle (3 liter) Nylon or fluorocarbon polymer nozzle ¹ (5/16 inch) and cap
	US DH-95 Nozzle ¹ (3/16, 1/4, or 5/16 inch) and cap Plastic or fluorocarbon polymer bottle (1 liter)
	D-77 Bag (plastic dipped) Slotted bottle (plastic) Nylon or fluorocarbon polymer nozzle ¹ (3/16, 1/4, or 5/16 inch) and cap Reynolds™ oven bag ²
	Frame-Bag (plastic dipped) Slotted bottle (plastic, 3 or 8 liter) Nylon or fluorocarbon polymer nozzle ¹ (1/4 or 5/16 inch) and cap Reynolds™ oven bag ²
	Crane with 3- or 4-wheel base and counterweights
	Reel, hanger bars, and pins
	Sounding weights for frame sampler
	Current meter for D-77 Frame-Bag sampler
	Bridge board and reel
	Plastic sheeting with weighted corners to cover bridge rail
	Biochemical Oxygen Demand sampler
	Volatile Organic Compound sampler
	Thief sampler
	Pumping sampler(s)
	Other

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Table 2-11. Sample-collection equipment for (A) surface water and (B) ground water—*Continued*

✓	(B) Ground-water-quality sample collection (refer to NFM 4)
	Positive-displacement submersible pump, discharge line, and reel
	Water-supply-well sample line and garden-hose threaded adaptor
	Thief-type sampler. (Examples: bailer, single or double-check valve, and bottom emptying device)
	Suction-lift pump (peristaltic or centrifugal)
	Antibacksiphon device
	Sample-water manifold to split sample water flow
	Flowthrough chamber for field-measurement electrodes (pH, conductivity, dissolved oxygen, water temperature, oxidation/reduction)
	Tubing, appropriate for type of pump and target analytes
	Tubing connectors, compatible with tubing and target analytes
	Water-level measuring tape, steel or electric
	Water-level indicator (blue chalk for steel tape)
	Weight, to attach to water-level measuring tape or sample line. Do not use lead. Use stainless steel or other relatively noncontaminating material.
	Power source for pump or reel
	Graduated bucket (to measure rate of discharge)
	Containers for disposal of purge water
	Flow controller for sampling pump
	Ground cloth, plastic
	Other

¹Use only nozzles purchased from the Federal Interagency Sedimentation Project.

²The Reynolds™ oven bag is the only plastic bag tested as of the date of publication. Other bags might be appropriate, but quality-control tests would be required before they could be certified for use.

Table 2-12. Sample-processing equipment and supplies

[NFM, *National Field Manual for the Collection of Water-Quality Data*; L, liter; mm, millimeter; μm , micrometer; in., inch; g, gram; mL, milliliter]

✓	Sample splitters (refer to NFM 5)
	Churn splitter, modified with funnel 8 or 14 L Polyethylene (polypropylene—inorganics only) Composite-sample container for organic-sample analytes
	Churn carrier
	Cone splitter Splitting chamber for cone splitter Bull's-eye bubble level and shims for cone splitter
	Large clear plastic bags Covering for churn splitter or cone splitter Covering for use as chamber cover
	Subsample bottle kits for whole-water samples
	Other
✓	Filtering systems for inorganics (refer to NFM 5)
	Processing chamber and chamber covers
	Peristaltic pump
	Pump tubing from ground-water pump (C-Flex™, silicon, fluorocarbon polymer)
	Filter assembly (disposable capsule, plate-type, other)
	Filter media (various diameters, pore sizes, and materials)
	Forceps (plastic or ceramic)
	Subsample bottle kits for filtered inorganic samples
	Deionized water
	Gloves (powderless, disposable vinyl)
	Other
✓	Filtering systems for organics (refer to NFM 5)
	Plate-filter assembly, aluminum or stainless steel, for 142-, 13-, or 293-mm diameter filter media
	Filter media, borosilicate glass fiber, 0.7- μm pore size, 142-mm diameter, baked; or 13-, 47-, or 293-mm diameter filter media
	Pump, ceramic piston valveless metering, with fluorocarbon polymer convoluted tubing or ground-water pump tubing
	Filter assembly, 25-mm diameter, in-line, with disposable nylon filter media
	Powderless disposable latex or nitrile gloves

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Table 2-12. Sample-processing equipment and supplies—*Continued*

✓	Filtration system for dissolved and suspended organic carbon (refer to NFM 5)	+
	Dissolved organic carbon filtering assembly, 47-mm diameter, stainless steel or fluorocarbon polymer	
	Filter, silver metal, 47-mm diameter, 0.45- μ m pore size	
	Hand pressure, peristaltic pump, or organic-grade compressed nitrogen-gas tank and pressure regulator	
	Tubing with in-line 0.2- μ m air filter	
	Cylinder, graduated, glass	
	Holding stand, ring, and medium three-prong clamp	
	Forceps, stainless steel or fluorocarbon polymers	
	Petri dish and sealable plastic bag	
	Foil, aluminum, heavy duty	
	Power source for pump (battery, generator, other)	
	Other	
✓	Solid-phase extraction (SPE) system (refer to NFM 5)	
	Valveless piston metering pump (ceramic) with fluorocarbon polymer convoluted tubing	
	Fluorocarbon polymer tubing, 1/8-in. outside diameter	
	Various tubing fittings, adaptors, connectors, and unions	
	Portable balance, 1 to 6,000 g	
	Graduated glass cylinders	+
	Beaker (plastic), 1,000 mL	
	Spike mixture and micropipette kit	
	Surrogate mixture and micropipette kit	
	SPE column (C-18 or Carbopac-B™)	
	Methanol, ascorbic acid, sodium chloride, and pesticide-grade organic water, all in fluorocarbon polymer dispenser bottles	
	Gloves, disposable, nonpowdered, latex or nitrile	
	Stopwatch	
	Aluminum foil	

Table 2-13. Sample-preservation equipment and supplies: surface water and ground water

[NFM, *National Field Manual for the Collection of Water-Quality Data*]

✓	Preservation equipment and supplies (refer to NFM 5)
	Preservation chamber(s)
	Chamber bags (large clear)
	Waste containers for spent preservative ampoules, dedicated for each chemical used
	Apron, goggles, powderless disposable gloves (vinyl, latex, nitrile)
	Nitric acid (analytical grade), in glass or fluorocarbon polymer ampoule
	Nitric acid/potassium dichromate ampoule
	Sulfuric acid ampoule
	Phosphoric acid/cupric sulfate ampoule
	Sodium hydroxide ampoule
	Hydrochloric acid
	Ascorbic acid
	Zinc acetate
	Phytoplankton kit
	Radon kit
	Cooler and ice
	Other

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Table 2-14. Cleaning equipment and supplies

[NFM, *National Field Manual for the Collection of Water-Quality Data*; ASTM, American Society for Testing and Materials; qw, Office of Water Quality Technical Memorandum; NWQL, National Water Quality Laboratory Technical Memorandum]

✓	General cleaning equipment and supplies (refer to NFM 3)
	Basins or standpipes (clear or white plastic, fluorocarbon polymer, stainless steel)
	Brushes (nonmetallic, clear or white)
	Detergent, laboratory phosphate-free (0.1-2 percent by volume)
	Apron
	Goggles
	Gloves
	Tap water
	Deionized water, District produced or equivalent (ASTM type 1) (qw 92.01)
	Wash bottles
	Material Safety Data Sheet for each chemical to be used
	Sealable plastic bags without color closure strips
	Other
✓	Inorganic constituents
	Hydrochloric acid, analytical grade (5 percent by volume)
	Neutralization container and marble chips
	Wash bottle for hydrochloric acid
	Inorganic-grade blank water (IBW) (NWQL 92.01)
	Safety equipment, such as Laboratory coat or apron Goggles Gloves Eyewash station Acid spill kit Safety shower
	Large plastic bags (clear or white)
	Plastic sheeting (clear or white)
	Other
✓	Organic Compounds
	Methanol, pesticide grade
	Waste container, methanol
	Wash bottle, methanol
	Aluminum foil
	Fluorocarbon polymer bags/sheeting
	Solvent spill kit
	Methanol Material Safety Data Sheet
	Pesticide- or volatile-grade blank water (PBW or VBW) (NWQL 92.01)
	Deionized water, District-produced or equivalent (ASTM Type 1)

Table 2-15. Shipping equipment and supplies

[NFM, *National Field Manual for the Collection of Water-Quality Data*; qw, Office of Water Quality Technical Memorandum]

✓	Shipping equipment and miscellaneous supplies (refer to NFM 5)
	Coolers, 1 to 5 gallon
	Boxes (sturdy)
	Packing material (foam sleeves, bubble wrap)
	Ice
	Large plastic bags for lining coolers and boxes
	Sample-bottle labels
	Analytical Services Request (ASR) form
	Return-address label and account number
	Sealable plastic bag for forms and return label
	Tape, fiber
	Shipping label (forms)
	Other
✓	Miscellaneous equipment and supplies
	Notebook and pen (indelible ink)
	Field instruments (NFM 6; qw 94.02)
	Calibration logbook for each instrument (NFM 6)
	Field folder(s) with station, site, and well information and permission form
	Field documentation forms
	Calculator and extra batteries
	Watch
	Tagline
	Stopwatch and headset for discharge measurement
	Hip boots
	Chest waders
	Rain gear
	Personal flotation device
	Traffic safety vest, cones, signs, warning lights
	First aid kit
	Highway emergency kit
	Tool kit
	Tape (electrical, fiber, fluorocarbon polymer, other)
	Plastic coat spray
	Fire extinguisher
	Flashlight with extra batteries
	Rechargeable batteries and backups, as needed
	Keys to sampling site, security locks, and vehicle (extra set)
	Weather report
	Field trip itinerary (copy to supervisor)

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Table 2-15. Shipping equipment and supplies—*Continued*

✓	Miscellaneous equipment and supplies— <i>Continued</i>
	Cellular phone or two-way radio
	Camera with extra film and batteries
	Work gloves
	Shovel, ice chisel/auger
	Boat, motor, gasoline, oil, paddle, oars
	Insect repellent (odorless)
	Sunscreen
	Soap (antibacterial)
	Paper towels (lint free)
	Safety plan(s) (NFM 9)
	Map(s)
	Locations and telephone numbers of hospitals and other emergency facilities (NFM 9)
	Other

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