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Standard Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities[1]

This standard is issued under the fixed designation D 6232; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers criteria ~~that~~which should be considered when selecting sampling equipment for collecting environmental and waste samples for waste management ~~activities (see Guides D 4687, D 5730, D 6009, D 6051, and Practice D 5283).~~ activities. This guide includes a list of equipment that is used and is readily available. Many specialized sampling devices are not specifically included in this guide. However, the factors that should be weighed when choosing any piece of equipment are covered and remain the same for the selection of any piece of equipment. Sampling equipment described in this guide includes automatic samplers, pumps, bailers, tubes, scoops, spoons, shovels, dredges, coring and augering devices. The selection of sampling locations is outside the scope of this guide.

~~1.1.1Table 1~~1.1.1 Table 1 lists selected equipment and its applicability to sampling matrices, including water (surface and ground), sediments, soils, liquids, multi-layered liquids, mixed solid-liquid phases, and consolidated and unconsolidated solids. The guide does not address specifically the collection of samples of any suspended materials from flowing rivers or streams. Refer to Guide D 4411 for more information.

~~1.2Table 2~~ 1.2 Table 2 presents the same list of equipment and its applicability for use based on compatibility of sample and equipment; volume of the sample required; physical requirements such as power, size, and weight; ease of operation and decontamination; and whether it is reusable or disposable.

~~1.3Table 3~~1.3 Table 3 provides the basis for selection of suitable equipment by the use of an Index.

1.4 Lists of advantages and disadvantages of selected sampling devices and line drawings and narratives describing the operation of sampling devices are also provided.

1.5 The values stated in both inch-pound and SI units are to be regarded separately as the standard units. The values given in parentheses are for information only.

1.6 This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This ~~guide~~document cannot replace education or experience and should be used in con junction with professional judgement. Not all aspects of this guide may be applicable in all circumstances. This ~~guide~~ ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this ~~guide~~document means only that ~~it~~the document has been approved through the ASTM consensus process.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 1452 Practice for Soil Investigation and Sampling by Auger Borings

D 1586 Test Method for Penetration Test and Split-Barrel Sampling of Soils

D 1587 Practice for Thin-Walled Tube ~~Geotechnical~~ Sampling of Soils for Geotechnical Purposes

D 3550~~Practice for Ring-Lined Barrel Sampling of Soils~~ Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils

D 4136 Practice for Sampling Phytoplankton with Water-Sampling Bottles

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[1] This guide is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.01 on Planning for Sampling.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D 4342 Practice for Collecting of Benthic Macroinvertebrates with Ponar Grab Sampler
D 4343 Practice for Collecting Benthic Macroinvertebrates with Ekman Grab Sampler
D 4348 Practice for Collecting Benthic Macroinvertebrates with Holme (Scoop) Grab Sampler
D 4387 Guide for Selecting Grab Sampling Devices for Collecting Benthic Macroinvertiebrates
D 4411 Guide for Sampling Fluvial Sediment in Motion
D 4448 Guide for Sampling Groundw-Water Monitoring Wells
D 4547Practice Guide for Sampling Waste and Soils for Volatile Organic Compounds
D 4687 Guide for General Planning of Waste Sampling
D 4696 Guide for Pore-Liquid Sampling from the Vadose Zone
D 4700 Guide for Soil Sampling from the Vadose Zone
D 4823 Guide for Core Sampling Submerged, Unconsolidated Sediments
D 5013 Practices for Sampling Wastes from Pipes and Other Point Discharges
D 5079 Practices for Preserving and Transporting Rock Core Samples
D 5088 Practices for Decontamination of Field Equipment Used at Nonradioactive Waste Sites
D 5283 Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation
D 5314 Guide for Soil Gas Monitoring in the Vadose Zone
D 5358 Practice for Sampling with a Dipper or Pond Sampler
D 5451 Practice for Sampling Using a Trier Sampler
D 5495 Practice for Sampling withWith a Composite Liquid Waste Sampler (COLIWASA)
D 5633 Practice for Sampling with a Scoop
D 5679 Practice for Sampling Consolidated Solids in Drums or Similar Containers
D 5680 Practice for Sampling Unconsolidated Solids in Drums or Similar Containers
D 5730 Guide for Site Characterization for Environmental Purposes withWith Emphasis on Soil, Rock, the Vadose Zone and Ground Water
D 5743 Practice for Sampling Single or Multilayered Liquids, With or Without Solids, in Drums or Similar Containers
D 5778 Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils
D 5781 Guide for Use of Dual-Wall Reverse-Circulation Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
D 5782 Guide for Use of Direct Air-Rotary Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
D 5783 Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
D 5784 Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
D 5875 Guide for Use of Cable-Tool Drilling and Sampling Methods for Geoenvironmental Exploration and Installation of Subsurface Water-Quality Monitoring Devices
D 5876 Guide for Use of Direct Rotary Wireline Casing Advancement Drilling Methods for Geoenvironmental Exploration and Installation of Subsurface Water-Quality Monitoring Devices
D 6001Guide for Direct-Push Water Sampling for Geoenvironmental Investigations Guide for Direct-Push Ground Water Sampling for Environmental Site Characterization
D 6009 Guide for Sampling Waste Piles
D 6044 Guide for Representative Sampling andfor Management of Waste and Contaminated Media
D 6051 Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities
D 6063 Guide for of Sampling of Drums and Similar Containers by Field Personnel
D 6151 Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling
D 6169 Guide for Selection of Soil and Rock Sampling Devices Used With Drill Rigs for Environmental Investigations
D 6282 Guide for Direct Push Soil Sampling for Environmental Site Characterizations
D 6286 Guide for Selection of Drilling Methods offor Environmental Site Characterization
D 6418 Practice for Using the Disposable En Core Sampler for Sampling and Storing Soil for Volatile Organic Analysis
D 6538 Guide for Sampling Wastewater withWith Automatic Samplers
D 6634 Guide for the Selection of Purging and Sampling Devices for Ground-Water Monitoring Wells
D 6640Practice for the Collection and Handling of Soils Obtained in Core Barrel Samplers for Environmental Investigations
D6661Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling
Practice for Collection and Handling of Soils Obtained in Core Barrel Samplers for Environmental Investigations
D 6699 Practice for Sampling Liquids Using Bailers
D 6759 Practice for Sampling Liquids usingUsing Grab and Discrete Depth Samplers

D 6771 Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water ~~Qualtiy~~Quality Investigations

D 6907 Practice for Sampling Soils and Contaminated Media with Hand-Operated Bucket Augers

E 300 Practice for Sampling Industrial Chemicals

~~E1391Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Toxicological Testing~~

E 1391 Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Toxicological Testing and for Selection of Samplers Used to Collect Benthic Invertebrates

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *consolidated*, *adj*—a compact solid not easily compressed or broken into smaller particles.

3.1.2 *decontamination*, *n*—the process of removing or reducing to a known level undesirable physical or chemical constituents, or both, from a sampling apparatus to maximize the representativeness of physical or chemical analyses proposed for a given sample.

3.1.3 *data quality objectives (DQOs)*, *n*— qualitative or quantitative statement(s) derived from the DQO process describing the problem(s), the decision rule(s) and the uncertainties of the decision(s) stated in the con text of the problem.

3.1.4 *environmental data*, *n*—defined for use in this document to mean data in support of environmental activities.

3.1.5 *matrix*, *n*—the principal constituent(s) or phase(s) of a material.

3.1.6 *unconsolidated*, *adj*—defined for use in this ~~guide~~document to mean uncemented or uncompacted material that is easily separated into smaller portions.

3.1.7 *representative sample*, *n*—a sample collected in such a manner that it reflects one or more characteristics of interest (as defined by the project objectives) of a population from which it was collected. ~~(D6044)~~ **(D 6044)**

4. Summary of Guide

4.1 This guide discusses important criteria which should be considered when choosing sampling equipment.

4.1.1 Criteria discussed in this ~~guide~~document include physical and chemical compatibility, sample matrix, sample volume, physical requirements, ease of operation and decontamination. Costs are considered, where appropriate.

4.2 A limited list of sampling equipment is presented in two separate tables. The list attempts to include a variety of different types of equipment. However, this list is in no way all inclusive, as there are many excellent pieces of equipment not included. Table 1lists matrices (surface and ground water, stationary sediment, soil and mixed phase wastes) and indicates which sampling devices are appropriate for use with these matrices. It also includes ASTM method references (draft standards are not included). Table 2indicates physical requirements (such as battery), electrical power, and weight; physical and chemical compatibility; effect on matrix; range of volume; ease of operation; decontamination; and reusability. Table 3~~provides sampler type selection process based upon the sample type and matrix to be sampled.~~

TABLE 1 Equipment Selection—Matrix Guide

Equipment (May be used for discrete sample collection	Water and Waste Water			Sediment	Soil	Waste				
	Surface Water	Ground Water	Point Discharge			Liquid	Multi-Layer Liquid	Mixed Phase Solid/Liquid	Consolidated Solid	Unconsolidated Solid
Pumps and Siphons										
Automatic Sampler—Non volatiles	√D 6538[G]	√D 6538[G]	-	-	N	N	N	-	-	-
Automatic Composite Sampler—Volatiles	√		√	-	-	-	-	-	-	-
Air/Gas Displacement Pump		√D 4448[G]	√	-	-	-	√	-	-	-
Piston Displacement Pump		√D 4448[G]	√	-	-		N	-	-	-
Bladder Pumps		√D 4448[G] D 6771[P]	√	- -	- -	N -	N -	- -	- -	- -
Peristaltic Pump	√	√D 4448[G]	√	-	-	√	√	N	-	-
Centrifugal Submersible Pump	√	√D 4448[G]	√	-	-	N	N	-	-	-
Gear Drive Pump	√	√D 6634[G]	√	-	-	N	N	-	-	-
Progressing Cavity Pump	√	√D 6634[G]	√	-	-	N	N	-	-	-
Inertia Lift Pump	-	√D 4448[G]	-	-	-	-	-	-	-	-
Dredges										
Ekman Dredge	-	-	-	√D 4387[G] D 4343[P]	-	-	-	-	-	-
Petersen Dredge	-	-	-	√D 4387[G]	-	-	-	-	-	-
Ponar Dredge	-	-	-	√D 4387[G] D 4342[P]	-	-	-	-	-	-
Discrete Depth Samplers										
Bacon Bomb	√D 6759[P]	-	-	-	-	√D 6759[P]	N	-	-	-
Kemmerer Sampler	√D 4136[P] D 6759[P]	- -	- -	- -	- -	√D 6759[P] -	N -	- -	- -	- -
Syringe Sampler	√D 5743[G] D 6759[P]	- -	N -	- -	- -	√D 6759[P] -	√D 6759[P] -	√D 6759[P] -	- -	- -
Peristaltic Pump	√D 6759[P]	√D 4448[G]	√D 6759[P]	-	-	√D 6759[P]	√D 6759[P]	N	-	-
Lidded Sludge/Water Sampler	-	-	-	-	-	N	N	√D 6759[P]	-	N
Discrete Level Sampler	√D 6759[P]	√	√D 6759[P]	-	-	√D 6759[P]	√D 6759[P]	-	-	-
Drive Push Samplers										
Direct Push Water Sampler	-	√	-	-	-	N	-	-	-	-
Probe Sampler, Hand Use	-	-	-	N	√	-	-	N	-	√
Probe Sampler, Rig Use	-	-	-	√D 4823[G]	√	√	√	N	-	N
Split Barrel Sampler	-	-	-	√	√D 1586[TM] √D 4700[G]	-	-	N	-	N
Continuous Core Sampler	-	-	-	√	√D 5784	-	-	√	-	N
Thin Walled Tube	-	-	-	√D 4823[G]	√D 1587[P] D 4700[G]	-	-	-	-	√
Coring Type w/Valve (Hand Use)	-	-	-	N	√D 4823[G]	-	-	√	-	√
Concentric Tube Thief (Hand Use)	-	-	-	-	-	-	-	-	-	√
Trier (Hand Use)	-	-	-	-	√	-	-	N	-	√D 5451[P] √E 300[P]
Miniature Core Sampler (Hand Use)	-	-	-	N	D 4700[G] √D 4547[G] D 6418[P]	-	-	-	-	N
Modified Syringe Sampler (Hand Use)	-	-	-	N	√D 4547[G]	-	-	-	-	N
Rotating Coring Devices										
Screw Auger	-	-	-	-	-	-	-	-	√	-
Rotating Corer	-	-	-	√D 4823[G]	√D 4700[G]	-	-	-	√	-
Captive Screw Auger	-	-	-	-	-	-	-	-	N	√
Augers										
Hand Operated Bucket Auger	-	-	-	N	√D 1452[P] D 4700[G] √D 6907[P]	-	-	-	-	√D 1452[P] √D 6907[P]
Solid Stem Flighted Auger	-	-	-	-	√D 1452[G] √D 6286[G]	-	-	-	N	N
Hollow Stem Flighted Auger	-	-	-	-	√D 5784[G] √D 6151[G]	-	-	-	N	N
Peat Borer	-	-	-	√	√	-	-	-	-	N
Liquid Profile Devices										
COLIWASA	-	-	-	-	-	√D 5495[P] √D 5743[G]	√D 5495[P] D 5743[G]	-	-	
Reuseable Point Sampler	N	-	N	-	-	√D 5743[G]	√D 5743[G]	√	-	-
Drum Thief	-	-	-	-	-	√D 5743[G]	√D 5743[G]	√	-	-
Valved Drum Sampler	-	-	-	-	-	√D 5743[G]	√D 5743[G]	√	-	-
Plunger Type Sampler	N	-	N	-	-	√D 5743[G]	√D 5743[G]	√D 5743[G]	-	-
Liquids Profiler	N	-	N	-	-	√D 6759[P]	√D 6759[P]	√D 6759[P]	-	-

TABLE 1 *Continued*

Equipment (May be used for discrete sample collection	Water and Waste Water			Sediment	Soil	Waste				
	Surface Water	Ground Water	Point Discharge			Liquid	Multi-Layer Liquid	Mixed Phase Solid/Liquid	Consolidated Solid	Unconsolidated Solid
Surface Sampling Devices (Liquids)										
Bailer	N	√D 4448[G]	-	-	-	N	N	-	-	-
		√D 6699[P]	-	-	-	-	-	-	-	-
Point Sampling Bailer	N	√D 4448[G]	-	-	-	N	N	-	-	-
		√D 6699[P]	-	-	-	-	-	-	-	-
Differential Pressure Bailer	-	√D 6699[P]	-	-	-	N	N	-	-	-
Dipper	√D 5358[P]	-	√D 5013[P]	-	-	√D 5358[P]	-	√D 5358[P]	-	-
Liquid Grab Sampler	√	-	N	-	-	√	√	√	-	-
Swing Jar Sampler	√	-	N	N	-	√	√	N	-	-
Passive Sampler, Bag Type	√	√	-	-	-	-	-	-	-	-
Passive Sampler, Chamber Type	-	√	-	-	-	-	-	-	-	-
Surface Sampling Devices (Solids)										
Impact Devices	-	-	-	-	-	-	-	-	√	-
Spoon	N	-	N	-	√D 4700[G]	N	N	-	-	N
Scoops and Trowel	-	-	-	N	√D 4700[G]	N	-	N	-	√
Shovels	-	-	-	N	√D 4700[G]	-	-	N	-	√
Multi-Level Sampling Devices										
Dedicated Type 1	-	√	-	-	N	-	-	-	-	-
Dedicated Type 2	-	√	-	-	N	-	-	-	-	-
Portable	-	N	-	-	√	-	-	-	-	-
Vadose Zone Pore Sampling Devices										
Vacuum Lysimeter	-	N	-	N	√D 4696[G]	-	-	-	-	-
Vacuum/Pressure Lysimeter	-	N	-	N	√D 4696[G]	-	-	-	-	-
Gas Adsorber	N	N	-	N	√D 5314[G]	-	-	-	-	-

√ = Equipment may be used with this matrix N = Not equipment of choice but use is possible - = Not recommended
[G] = ASTM Guide ™ = ASTM Test Method [P] = ASTM Practice

~~TABLE 3 Index of Sampling Equipment~~

TABLE 1 2 Equipment Selection—Matrix Guide

Equipment ~~(May be used for discrete sample collection~~				~~WatCher and Waste Water~~	~~Sediment~~	~~Soil~~			
~~Surface~~ Water	Ground Water	P oint Discharge	Liquid	Multi-Layer Liquid			Mixed Phase S olid/Liquid	Consolidated Solid	Unconsolidated
Surfacal	Physical	Effect on Sample	Volume Range	Physical	Ease of Operation	Decon	Disposal or Reuse		
~~Pumps and Siphons~~									
Pumps and Siphon									
~~Automatic Sampler—Nonvolatiles~~	~~*D 6538[G]~~	~~*D 6538[G]~~	-	-	~~N~~	~~N~~	~~N~~	-	-
Automatic Sampler–Nonvolatiles	X	X	√	U	B/P	√	X	-	-
~~Automatic Composite Sampler—Volatiles~~	~~*~~		~~*~~	-	-	-	-	-	-
Automatic Composite Sampler–Volatiles	X	X	√	U	B/P	X	X	-	-
~~Air/Gas Displacement Pump~~		~~*D 4448[G]~~	~~*~~	-	-	-	~~*~~	-	-
Air/Gas Displacement Pump	√	X	X	U	P/S/W	X	X	-	-
~~Piston Displacement Pump~~		~~*D 4448[G]~~	~~*~~	-	-		~~N~~	~~R~~	
Piston Displacement Pump	√	X	X	U	P/S/W	X	X	R	
~~Bladder Pumps~~	-	-							
Bladder Pumps	√	-							
~~Bladder Pumps~~		*D 4448[G]	*	-	-	NR			
Bladder PumpsX	√	U	P	X	X	R			
~~Corrugated Bladder Pump~~	~~N~~	-	-	-					
Corrugated Bladder Pump	√	X ~~D 6771[P]~~	√	-	-	-	-	-	-
U		~~D 6771[P]~~	√	X	-	-	-	-	-
~~Peristaltic Pump~~	~~*~~	~~*D 4448[G]~~	~~*~~	-	-	~~*~~	~~*~~	~~N~~	-
Peristaltic Pump	X	X	√	U	B/P	X	√	N	-
~~Centrifugal Submersible Pump~~	~~*~~	~~*~~	~~*~~	-	-	~~N~~	~~N~~	-	-
Centrifugal Submersible Pump	X	X	X	U	P/S/W	√	X	-	-
~~Gear Drive Pump~~	~~*~~	~~*~~	~~*~~	-	-	~~N~~	~~N~~	-	-
Gear Drive Pump	X	X	X	U	B/P	√	X	-	-
~~Progressing Cavity Pump~~	~~*~~	~~*~~	~~*~~	-	-	~~N~~	~~N~~	-	-
Progressive Cavity Pump	X	X	X	U	P	√	X	-	-
~~Inertia Lift Pump~~	-	~~*~~	-	-	-	-	-	-	-
Inertia Lift Pump	X	X	X	U	B/N	√	√	-	-
~~Dredges~~									
~~Dredges~~									
Ekman Dredge	√	√	X	0.5-3.0	N	X	X	R	
~~Ekman Dredge~~	-	-	-	~~*D 4387[G]~~ ~~D 4343[P]~~	-	-	-	-	-
Petersen Dredge	√	√	X	0.5-3.0	W	X	X	-	-
~~Petersen Dredge~~	-	-	-	~~*D 4387[G]~~	-	-	-	-	-
Ponar Dredge	√	√	X	0.5-3.0	W	X	X	-	-
~~Ponar~~**~~Dredge~~**	-	-	-	~~*D 4387[G]~~	-	-	-	-	-
Discrete Depth Samplers								-	-
				~~D4342[P]~~					
Bacon Bomb	X	X	√	0.1-0.94	N	√	X	R	
~~Discrete Depth Samplers~~									
Kemmerer Sampler	X	X	X	1.0-2.0	N	X	X	R	
~~Bacon Bomb~~	~~*D 6759[P]~~	-	-	-	-	~~*D 6759[P]~~	N	-	-
Syringe Sampler	√	√	√	0.2-0.5	-	~~*D 6759[P]~~	N	√	X
~~Kemmerer Sampler~~	~~*D 4136[P]~~	-	-	-	-	~~*D 6759[P]~~	~~N~~	-	-
Lidded Sludge/Water Sampler	√ ~~D 6759[P]~~	X -	X -	1.0 -	S/W -	X -	X -	- -	- -
~~Syringe Sampler~~	~~*D 5743[G]~~	-	~~N~~	-	-	~~*D 6759[P]~~	~~*D 6759[P]~~	~~*D 6759[P]~~	-
Discrete Level Sampler	√ ~~D 6759[P]~~	X -	√ -	0.2-0.5 -	N -	√ -	√ -	~~*D 6759[P]~~ -	- -
~~Peristaltic Pump~~	~~*D 6759[P]~~	~~*D 4448[G]~~	~~*D 6759[P]~~	-	-	~~*D 6759[P]~~	~~*D 6759[P]~~	~~N~~	-
Bailer	X	√	X	0.5-2.0	N	√	√	~~N~~	-
~~Lidded Sludge/Water Sampler~~	-	-	-	-	-	N	N	*D 6759[P]	-
Point Sampling Bailer	X	√	√	0.5-2.0	-	N	√	√	-
~~Discrete Level Sampler~~	~~*D 6759[P]~~	~~*~~	~~*D 6759[P]~~	-	-	~~*D 6759[P]~~	~~*D 6759[P]~~	-	-
Differential Pressure Bailer	√	√	√	0.04-1.0	N	√	X	-	-
Dipper	√	X	√	0.5-1.0	N	√	√	R	
~~Push Coring Devices~~									
Liquid Grab Sampler	√	√	√	0.5-1.0	N	√	√	R	
~~Temporary G.W. Sampler~~	-	~~*~~	-	-	-	N	-	-	-
Swing Jar Sampler	X	√	√	0.5-1.0	-	N	√	√	-
~~Penetrating Probe Sampler~~	-	-	-	~~N~~	~~*~~	-	-	~~N~~	-
Drive/Push Samplers								~~N~~	-
~~Split Barrel Sampler~~	-	-	-	~~*~~	~~*D 1586[TM]~~ ~~*D 4700[G]~~	-	-	~~N~~	-
Direct Push Water Sampler	√	√	√	0.1-0.3	P/S/W	X	X	~~N~~	-
~~Concentric Tube Thief~~	-	-	-	-	-	-	-	-	-
Probe Sampler	√	√	X	0.2-2.0	S/W	X	√	-	-
~~Trier~~	-	-	-	-	~~*~~	-	-	~~N~~	-
Split Barrel Sampler	√	√	X	0.5-30.0	S/W	X	√	~~N~~	-

TABLE 3 *Continued*

Media Type	Sampler Type	Section	Sample Type
Consolidated Solid	Rotating Corer	(7.6.2)	Surface or Depth, Undisturbed
	Screw Auger	(7.6.1)	Surface, Disturbed
	Impact Device	(7.11.1)	Surface, Disturbed
Unconsolidated Solid	Lidded Sludge	(7.4.4)	Discrete, Composite
	Penetrating Probe	(7.5.2)	Discrete, Undisturbed
	Split Barrel	(7.5.3)	Discrete, Undisturbed
	Concentric Tube Thief	(7.5.4.1)	Surface, Disturbed, Selective
	Trier	(7.5.4.2)	Surface, Relatively Undisturbed, Selective
	Thin Walled Tube	(7.5.5)	Surface or Depth, Undisturbed
	Coring Type w/Valve	(7.5.6)	Surface or Depth, Disturbed
	Bucket Auger	(7.7.1)	Surface or Depth, Disturbed
	Flighted Auger	(7.7.2)	Surface or Depth, Disturbed
	Captive Screw Auger	(7.6.3)	Discrete, Disturbed
	Soft Sediment Sampler	(7.5.9)	Surface, Undisturbed
	Peat Borer	(7.7.3)	Discrete, Relatively Undisturbed
	Spoon	(7.11.2)	Surface, Disturbed, Selective
	Scoops/Trowel	(7.11.3)	Surface, Disturbed, Selective
	Shovel	(7.11.4)	Surface, Disturbed
	Miniature Core	(7.5.7)	Surface, Undisturbed
	Modified Syringe	(7.5.8)	Surface, Undisturbed
Soil	Penetrating Probe	(7.5.2)	Discrete, Undisturbed
	Split Barrel	(7.5.3)	Discrete, Undisturbed
	Trier	(7.5.4.2)	Surface, Relatively Undisturbed, Selective
	Thin Walled Tube	(7.5.5)	Surface or Depth, Undisturbed
	Coring Type w/Valve	(7.5.6)	Surface or Depth, Disturbed
	Bucket Auger	(7.7.1)	Surface or Depth, Disturbed
	Flighted Auger	(7.7.2)	Surface or Depth, Disturbed
	Soft Sediment Sampler	(7.5.9)	Surface, Undisturbed
	Peat Borer	(7.7.3)	Discrete, Relatively Undisturbed
	Spoon	(7.11.2)	Surface, Disturbed, Selective
	Scoops/Trowel	(7.11.3)	Surface, Disturbed, Selective
	Shovel	(7.11.4)	Surface, Disturbed
	Miniature Core	(7.5.7)	Surface, Undisturbed
	Modified Syringe	(7.5.8)	Surface, Undisturbed
Mixed Solid/Liquid	AutoSampler, Non-V.	(7.2.1)	Shallow, Composite-Suspended Solids only
	Peristaltic Pump	(7.2.4)	Shallow, Discrete or Composite-Suspended Solids Only
	Syringe Sampler	(7.4.3)	Shallow, Discrete, Disturbed
	Lidded Sludge/Water	(7.4.4)	Discrete, Composite
	Penetrating Probe	(7.5.2)	Depth, Discrete, Undisturbed
	Split Barrel	(7.5.3)	Depth, Discrete, Undisturbed
	Soft Sediment Sampler	(7.5.9)	Surface, Undisturbed
	Peat Borer	(7.7.3)	Discrete, Relatively Undisturbed
	Trier	(7.5.4.2)	Surface, Semi-solid only, Selective
	Coring Type w/Valve	(7.5.6)	Depth, Disturbed
	COLIWASA	(7.8.1)	Shallow, Composite, Semi-liquid only
	Reuseable Point	(7.8.1.2)	Shallow, Discrete
	Plunger Type	(7.8.4)	Shallow, Discrete
	Liquids Profiler	(7.8.5)	Depth, Composite-Suspended Solids only
	Drum Thief	(7.8.2)	Shallow, Composite-Semi-Liquid only
	Valved	(7.8.3)	Shallow, Composite-Semi-Liquid only
	Dipper	(7.4.9)	Shallow, Composite
	Liquid Grab	(7.4.10)	Shallow, Composite-Suspended Solids only
	Swing Jar	(7.4.11)	Shallow, Composite
	Scoops/Trowel	(7.11.13)	Shallow, Composite, Semi-solid only
	Shovel	(7.11.14)	Shallow, Composite, Semi-solid only
Sediments	Ekman Dredge	(7.3.1)	Bottom Surface, Soft only, Disturbed
	Petersen Dredge	(7.3.2)	Bottom Surface, Rocky or Soft, Disturbed
	Ponar	(7.3.3)	Bottom Surface, Rocky or Soft, Disturbed
	Penetrating Probe	(7.5.2)	Bottom Surface or Depth, Undisturbed
	Split Barrel	(7.5.3)	Bottom Surface or Depth, Relatively Undisturbed
	Thin Walled Tube	(7.5.5)	Bottom Surface or Depth, Undisturbed
	Coring Type w/Valve	(7.5.6)	Bottom Surface or Depth, Disturbed
	Bucket Auger	(7.7.1)	Bottom Surface, Disturbed
	Soft Sediment	(7.5.9)	Bottom Surface, Undisturbed
	Peat Borer	(7.7.3)	Discrete, Relatively Undisturbed
	Rotating Corer	(7.6.2)	Bottom Surface, Undisturbed if solid
	Scoops, Trowel	(7.11.3)	Exposed Surface only, Disturbed, Selective
	Shovel	(7.11.4)	Exposed Surface only, Disturbed
	Minature Core	(7.5.7)	Exposed Surface only, Undisturbed
	Modified Syringe	(7.5.8)	Exposed Surface only, Undisturbed
	Auto Splr. – Non Vols.	(7.2.1)	25-ft Lift, Discrete or Composite

TABLE 3 *Continued*

Media Type	Sampler Type	Section	Sample Type
	Auto Splr. - Vols.	(7.2.1)	25-ft Lift, Discrete
	Peristaltic Pump	(7.2.4)	Shallow(25-ft), Discrete
	Centrifugal Sub. Pump	(7.2.5)	Depth, Discrete
	Gear Drive Pump	(7.2.6)	Depth, Discrete
Surface Water	Progressing Cavity Pump	(7.2.7)	Depth, Discrete
	Bacon Bomb	(7.4.1)	Depth, Discrete
	Kemmerer	(7.4.2)	Depth, Discrete
	Discrete Level	(7.4.5)	Depth, Discrete
	Plunger Type	(7.8.4)	Shallow (12-ft), Discrete
	Liquids Profiler	(7.8.5)	Shallow, Composite
	Dipper	(7.4.9)	Shallow (10-ft.), Composite
	Liquid Grab	(7.4.10)	Shallow (6-ft), Composite
	Swing Jar	(7.4.11)	Shallow, (10-ft), Composite
	Spoon	(7.11.12)	Shallow (1-in.), Composite
	Air/Gas Displacement	(7.2.2.1)	Depth, Discrete
	Piston Displacement	(7.2.2.2)	Depth, Discrete
Ground Water	Bladder Pump	(7.2.3)	Depth, Discrete
	Peristaltic Pump	(7.2.4)	25-ft Lift, Discrete
	Centrifugal Sub. Pump	(7.2.5)	Depth, Discrete
	Gear Drive Pump	(7.2.6)	Depth, Discrete
	Progressing Cavity Pump	(7.2.7)	Depth, Discrete
	Inertia Lift Pump	(7.2.8)	Depth Discrete
	Discrete Level	(7.4.5)	Depth, Discrete
	Temp. Ground Water	(7.5.1.1)	Depth, Discrete
	Bailer	(7.4.6)	Depth, Composite
	Point Sampling Bailer	(7.4.7)	Depth, Discrete
	Diff. Pressure Bailer	(7.4.8)	Depth, Discrete
	Bag Type Diffusion	(7.9.1)	Depth Discrete
	Chamber Type Diffusion	(7.9.2)	Multiple Depths, Discrete
	Dedicated Multi-Level	(7.10.1)	Multiple Depths, Discrete
	Portable Multi-Level	(7.10.2)	Multiple Depths, Discrete, Pore water
	AutoSplr. -Non Vols.	(7.2.1)	Shallow (25-ft), Discrete or Composite
	Auto Splr. - Vols.	(7.2.1)	Shallow (25-ft), Discrete
	Gear Drive Pump	(7.2.6)	Depth, Discrete
	Progressing Cavity Pump	(7.2.7)	Depth, Discrete
Liquid Effluent	Peristaltic Pump	(7.2.4)	Shallow (25-ft), Discrete
	Centrifugal Sub. Pump	(7.2.5)	Depth, Discrete
	Bacon Bomb	(7.4.1)	Depth, Discrete
	Kemmerer	(7.4.2)	Depth, Discrete
	Syringe Sampler	(7.4.3)	Shallow (8-ft), Discrete
	Discrete Level	(7.4.5)	Depth, Discrete
	Reuseable Point	(7.8.1.2)	Shallow (8-ft), Discrete
	Valved Sampler	(7.8.3)	Shallow, Discrete
	Plunger Type	(7.8.4)	Shallow (12-ft), Discrete
	Liquids Profiler	(7.8.5)	Shallow, Composite
	Dipper	(7.4.9)	Shallow (10-ft), Composite
	Liquid Grab	(7.4.10)	Shallow (6-ft), Composite
	Swing Jar	(7.4.11)	Shallow (10-ft), Composite
	Spoon	(7.11.12)	Shallow (1-in.), Composite
	Air/Gas Displacement	(7.2.2.1)	Depth, Discrete
	Piston Displacement	(7.2.2.2)	Depth, Discrete
	Bladder Pump	(7.2.3)	Depth, Discrete
Liquid	Peristaltic Pump	(7.2.4)	Shallow (25-ft), Discrete
	Centrifugal Sub. Pump	(7.2.5)	Depth, Discrete
	Gear Drive Pump	(7.2.6)	Depth, Discrete
	Progressing Cavity Pump	(7.2.7)	Depth, Discrete
	Syringe Sampler	(7.4.3)	Shallow (8-ft), Discrete
	Lidded Sludge/Water	(7.4.4)	Shallow (8-ft), Discrete
	Discrete Level	(7.4.5)	Depth, Discrete
	Temp. Ground Water	(7.5.1.1)	Depth, Discrete
	COLIWASA	(7.8.1)	Shallow (4-ft), Composite
	Reuseable Point	(7.8.1.2)	Shallow (8-ft), Discrete
	Plunger Type	(7.8.4)	Shallow, (12-ft), Discrete
	Liquids Profiler	(7.8.5)	Shallow, Composite
	Drum Thief	(7.8.2)	Shallow (3-ft), Composite
	Valved Sampler	(7.8.3)	Shallow (8-ft), Composite
	Bailer	(7.4.6)	Depth, Discrete
	Point Sampling Bailer	(7.4.7)	Depth, Discrete
	Diff. Pressure Bailer	(7.4.8)	Depth, Discrete
	Dipper	(7.4.9)	Shallow (10-ft), Composite
	Liquid Grab	(7.4.10)	Shallow (6-ft), Composite
	Swing Jar	(7.4.11)	Shallow, (10-ft), Composite
	Spoon	(7.11.2)	Shallow (1-in.), Composite

TABLE 3 *Continued*

Media Type	Sampler Type	Section	Sample Type
	Scoops & Trowel	(7.11.3)	Shallow, (1-in.), Composite
	Air/Gas Displacement	(7.2.2.1)	Depth, Discrete
	Piston Displacement	(7.2.2.2)	Depth Discrete
	Bladder Pump	(7.2.3)	Depth, Discrete
	Peristaltic Pump	(7.2.4)	Shallow(25-ft), Discrete
	Centrifugal Sub. Pump	(7.2.5)	Depth, Discrete
	Gear Drive Pump	(7.2.6)	Depth, Discrete
	Progressing Cavity Pump	(7.2.7)	Depth, Discrete
Multi Layer	Syringe Sampler	(7.4.3)	Shallow (8-ft), Discrete
Liquid	Discrete Level	(7.4.5)	Depth, Discrete
	Temp. Ground Water	(7.5.1.1)	Depth, Discrete
	COLIWASA	(7.8.1)	Shallow (4-ft), Composite
	Reuseable Point	(7.8.1.2)	Shallow (8-ft), Discrete
	Plunger Type	(7.8.4)	Shallow, (12-ft), Discrete
	Liquids Profiler	(7.8.5)	Shallow, Composite
	Drum Thief	(7.8.2)	Shallow (3-ft), Composite
	Valved Sampler	(7.8.3)	Shallow (8-ft), Composite
	Bailer	(7.4.6)	Depth, Discrete
	Point Sampling Bailer	(7.4.7)	Depth, Discrete
	Diff. Pressure Bailer	(7.4.8)	Depth, Discrete
	Dipper	(7.4.9)	Shallow (10-ft), Composite
	Liquid Grab	(7.4.10)	Shallow (6-ft), Composite
	Swing Jar	(7.4.11)	Shallow (10-ft), Composite
	Spoon	(7.11.2)	Shallow (1-in.), Composite

provides sampler type selection process based upon the sample type and matrix to be sampled.

5. Significance and Use

5.1 Although many technical papers address topics important to efficient and accurate sampling investigations (DQO's, study design, QA/QC, data assessment (; see Guides D 4687, D 5730D 5730, D 6009, D 6051, and Practice D 5283)),), the selection and use of appropriate sampling equipment is assumed or omitted.

5.2 The choice of sampling equipment can be crucial to the task of collecting a sample appropriate for the intended use.

5.3 When a sample is collected, all sources of potential bias should be considered, not only in the selection and use of the sampling device, but also in the interpretation and use of the data generated. Some major considerations in the selection of sampling equipment for the collection of a sample are listed below: below.

5.3.1 The ability to access and extract from every relevant location in the target population,

5.3.2 The ability to collect a sufficient mass of sample such that the distribution of particle sizes in the population are represented, and

5.3.3 The ability to collect a sample without the addition or loss of constituents of interest.

5.4 The characteristics discussed in 5.3 are particularly important in investigations when the target population is heterogeneous such as when particle sizes vary, liquids are present in distinct phases, a gaseous phase exists or material from different sources are present in the population. The consideration of these characteristics during the equipment selection process will enable the data user to make appropriate statistical inferences about the target population based on the sampling results.

6. Selection Criteria

6.1 Refer to Tables 1 and Table 2 for a summary of matrix compatibility and selection criteria. Refer to Table 3 for an index of sampling equipment based upon sample type and matrix to be sampled. Note1—Information on sample containers and equipment used in sampling that is not used in the actual collection of the sample is not within the scope of this guide.

6.2 *Compatibility*— It is important that sampling equipment, other equipment which may come in contact with samples (such as gloves, mixing pans, knives, spatulas, spoons, etc.) and sample containers be constructed of materials that are compatible with the matrices and analytes of interest. Incompatibility may result in the contamination of the sample and the degradation of the sampling equipment. Appropriate sampling equipment must be compatible chemically and physically.

6.2.1 *Chemical Compatibility*—The effects of a matrix on the sampling equipment is usually considered in the light of the analytes, or groups of analytes of interest. For example, poly vinyl chloride (PVC) has been found to degrade in the presence of many separate phase organic compounds in water; therefore, it would be preferable to collect ground water samples for organic analyses using polytetrafluoroethylene (PTFE), stainless steel, or glass sampling equipment **(1, 2)**.[3] Acids, bases, and high chloride ground water in coastal areas, and wastes with high concentrations of solvents may also degrade many types of sampling equipment over time. The residence or contact time, the time the sample is in contact with the sampling equipment, may be significant in terms of chemical interaction between the sampled matrix and the equipment.

[3] The boldface numbers given in parentheses refer to athe list of references at the end of the text.this standard.

TABLE 2 3 Sampling Equipment Selection Guide

EquMedia Typment	ChemieSampler Type	PhysiSecaltion	Effect onSample Type	
Consolidated	VolumeRange	Physical	Ease of Operation	DeconDisposa
Consolidated	Rotating Corer	(7.6.2)	Surface oration	Depth, Und
Pumps andSiphon			Surface, Disturbed	
Solid	Screw Auger	(7.6.1)	Surface, Disturbed	
		(7.11.1)	Surface, Disturbed	
	Impact Device	(7.11.1)	Surface, Disturbed	
	Lidded Sludge	(7.4.4)	Discrete, Composite	
Automatic Sampler–Nonvolatiles	•	•	√	Discrete, Undist
	Probe Sampler	(7.5.2)	√	Discrete, Undist
U	B/P	•	•	R
	Split Barrel	(7.5.3)	•	RDiscrete, U
Automatic Composite Sampler–Volatiles	•	•	√Surface, Disturbed, Selective	
	Concentric Tube Thief	(7.5.7.1)	Surface, Disturbed, Selective	
	U	B/P	•Surface, Relatively Undisturbed, Selective	
	Trier	(7.5.7.2)	Surface, Relatively Undisturbed, Selective	
Unconsolidated	•	R(7.5.5)	Surface or Depth, Undisturbed	
Unconsolidated	Thin Walled Tube	(7.5.5)	Surface or Depth, Undisturbed	
Air/Gas Displacement Pump	•	•	•	Surface or Dept
Solid	Coring Type w/Valve	(7.5.6)	•	Surface or Dept
U	P/S/W	•	•Surface or Depth, Disturbed	
	Hand-Operated Bucket Auger	(7.7.1)	Surface or Depth, Disturbed	
	RSolid Stem Flighted Auger	(7.7.2.1)	Surface or Depth, Disturbed	
	Solid Stem Flighted Auger	(7.7.2.1)	Surface or Depth, Disturbed	
Piston Displacement Pump	•	(7.7.2.2)	Surface or Depth, Disturbed (if from flights)	
	Hollow Stem Flighted Auger	(7.7.2.2)	Surface or Depth, Disturbed (if from flights)	
	Captive Screw Auger	(7.6.3)	Discrete, Disturbed	
	Peat Borer	(7.7.3)	Discrete, Relatively Undisturbed	
•	•	U	P/S/WSurface, Disturbed, Selective	
	Spoon	(7.11.2)	Surface, Disturbed, Selective	
	•	•	R	
	Scoops/Trowel	(7.11.3)	Surface, Disturbed, Selective	
Bladder Pumps	√	•	√Surface, Disturbed	
	Shovel	(7.11.4)	Surface, Disturbed	
	U	P/S/W	•Surface, Undisturbed	
	Miniature Core	(7.5.8)	Surface, Undisturbed	
	•	R(7.5.9)	Surface, Undisturbed	
	Modified Syringe	(7.5.9)	Surface, Undisturbed	
Peristaltic Pump	•	•	√Discrete, Undisturbed	
	Probe Sampler	(7.5.2)	Discrete, Undisturbed	
	U	B/P	•Discrete, Undisturbed	
	Split Barrel	(7.5.3)	Discrete, Undisturbed	
	√	(7.5.7.2)	Surface, R	
	Trier	(7.5.7.2)	Surface, Relatively Undisturbed, Selective	
Centrifugal Submersible Pump	•	•	•Surface or Depth, Undisturbed	
	Thin Walled Tube	(7.5.5)	Surface or Depth, Undisturbed	
	U	P/S/W	√Surface or Depth, Disturbed	
	Coring Type w/Valve	(7.5.6)	Surface or Depth, Disturbed	
	•	R(7.7.1)	Surface or Depth, Disturbed	
	Hand-Operated Bucket Auger	(7.7.1)	Surface or Depth, Disturbed	
Gear Drive Pump	•	•	•Surface or Depth, Disturbed	
	Solid Stem Flighted Auger	(7.7.2.1)	Surface or Depth, Disturbed	
Soil	U	B/P	√	•
Soil	Hollow Stem Flighted Auger	(7.7.2.2)	√	•
Progressive Cavity Pump	•	•	•	U
	Peat Borer	(7.7.3)	•	U
Inertia Lift Pump	•	•	√	U
	Spoon	(7.11.2)	√	U
Dredges			Surface, Disturbed, Selective	
	Scoops/Trowel	(7.11.3)	Surface, Disturbed, Selective	
			Surface, Disturbed	
	Shovel	(7.11.4)	Surface, Disturbed	
		(7.5.8)	Surface, Undisturbed	
	Miniature Core	(7.5.8)	Surface, Undisturbed	
Ekman Dredge	√	√	•Surface, Undisturbed	
	Modified Syringe	(7.5.9)	Surface, Undisturbed	
	0.5-3.0	N	•Surface to Depth, Pore Liquid	
	Vacuum Lysimeter	(7.12.1)	Surface to Depth, Pore Liquid	
	•	R(7.12.2)	Depth, Pore Liquid	
	Vacuum/Pressure Lysimeter	(7.12.2)	Depth, Pore Liquid	
Petersen Dredge	√	√	•Surface to Depth, Soil Gas	

TABLE 3 *Continued*

EquMedia Typment	ChemicSampler Type	PhysiSecaltion	Effect onSample Type	
	Gas Adsorber	(7.12.3)	Surface to Depth, Soil Gas	
	0.5-3.0	W	•Shallow, Composite-Suspended Solids only	
	AutoSampler, Non V.	(7.2.1)	Shallow, Composite-Suspended Solids only	
	•	R(7.2.5)	Shallow, Discrete or Composite-Suspended Solids Only	
	Peristaltic Pump	(7.2.5)	Shallow, Discrete or Composite-Suspended Solids Only	
Ponar Dredge	√	√	•Shallow, Discrete, Disturbed	
	Syringe Sampler	(7.4.3)	Shallow, Discrete, Disturbed	
	0.5-3.0	W	•Discrete, Composite	
	Lidded Sludge/Water	(7.4.4)	Discrete, Composite	
	•	R(7.5.2)	Depth, Discrete, Undisturbed	
	Probe Sampler	(7.5.2)	Depth, Discrete, Undisturbed	
Discrete Depth Samplers			Depth, Discrete, Undisturbed	
	Split Barrel	(7.5.3)	Depth, Discrete, Undisturbed	
		(7.7.3)	Discrete, Relatively Undisturbed	
	Peat Borer	(7.7.3)	Discrete, Relatively Undisturbed	
	Trier	(7.5.7.2)	Surface, Semi-solid only, Selective	
Bacon Bomb	•	√	√	Depth, Distur
	Coring Type w/Valve	(7.5.6)	√	Depth, Distur
0.1-0.5	N	√	•	
Mixed Solid/Liquid	COLIWASA	(7.8.1)	•	RShallow, Semi-li
Kemmerer Sampler	•	√	√Shallow, Discrete	
	Reuseable Point	(7.8.1.2)	Shallow, Discrete	
	1.0-2.0	N	√Shallow, Discrete	
	Plunger Type	(7.8.4)	Shallow, Discrete	
	•	R(7.8.5)	Depth, Composite-Suspended Solids only	
	Liquids Profiler	(7.8.5)	Depth, Composite-Suspended Solids only	
Syringe Sampler	√	√	√	Shallow, Con Liquid only
	Drum Thief	(7.8.2)	√	Shallow, Con Liquid only
0.2-0.5	N	√	√	
	Valved	(7.8.3)	√	RShallow, Co Liqu
Lidded Sludge/Water Sampler	√	•	•Shallow, Composite	
	Dipper	(7.4.9)	Shallow, Composite	
	1.0	S/W	•Shallow, Composite-Suspended Solids only	
	Liquid Grab	(7.4.10)	Shallow, Composite-Suspended Solids only	
	•	R(7.4.11)	Shallow, Composite	
	Swing Jar	(7.4.11)	Shallow, Composite	
Discrete Level Sampler	√	•	√Shallow, Composite, Semi-solid only	
	Scoops/Trowel	(7.11.3)	Shallow, Composite, Semi-solid only	
	0.2-0.5	N	√Shallow, Composite, Semi-solid only	
	Shovel	(7.11.4)	Shallow, Composite, Semi-solid only	
	•	R(7.3.1)	Bottom Surface, Soft only, Disturbed	
	Ekman Dredge	(7.3.1)	Bottom Surface, Soft only, Disturbed	
Push Coring Devices			Bottom Surface, Rocky or Soft, Disturbed	
	Petersen Dredge	(7.3.2)	Bottom Surface, Rocky or Soft, Disturbed	
			Bottom Surface, Rocky or Soft, Disturbed	
	Ponar	(7.3.3)	Bottom Surface, Rocky or Soft, Disturbed	
		(7.5.2)	Bottom Surface or Depth, Undisturbed	
	Probe Sampler	(7.5.2)	Bottom Surface or Depth, Undisturbed	
Temporary G.W. Sampler	√	√	√Bottom Surface or Depth, Relatively Undisturbed	
	Split Barrel	(7.5.3)	Bottom Surface or Depth, Relatively Undisturbed	
Sediments	0.1-0.3	P/S/W	•Bottom Surface or Depth, Undisturbed	
Sediments	Thin Walled Tube	(7.5.5)	Bottom Surface or Depth, Undisturbed	
	•	R		
	Coring Type w/Valve	R		
Penetrating Probe Sampler	√Bottom Surface or Depth, Disturbed			
Penetrating Probe Sampler(7.5.6)	Bottom Surface or Depth, Disturbed			
	√	√	0.2-2.0Bottom Surface, Disturbed	
	Hand-Operated Bucket Auger	(7.7.1)	Bottom Surface, Disturbed	
	Peat Borer	(7.7.3)	Discrete, Relatively Undisturbed	
S/W	•	√	R	
	Rotating Corer	(7.6.2)	Bottom Surface, Undisturbed if solid	
Split Barrel Sampler	√	√	•	Exposed Sur Disturbed, Se
	Scoops, Trowel	(7.11.3)	•	Exposed Sur Disturbed, Se
0.5-30.0	S/W	√	√Exposed Surface only, Disturbed	
	Shovel	(7.11.4)	Exposed Surface only, Disturbed	

TABLE 3 *Continued*

EquMedia Typment	ChemieSampler Type	PhysiSecaltion	Effect onSample Type	
	RMinature Core	(7.5.8)	Exposed Surface only, Undisturbed	
	Minature Core	(7.5.8)	Exposed Surface only, Undisturbed	
Concentric Tube Theif	√	(7.5.9)	Exposed Surface only, Undisturbed	
	Modified Syringe	(7.5.9)	Exposed Surface only, Undisturbed	
√	√	0.5-1.0	N25-ft Lift, Discrete or Composite	
	Auto Splr. - Non Vols.	(7.2.1)	25-ft Lift, Discrete or Composite	
	√	√	R	
	Auto Splr. - Vols.	(7.2.1)	25-ft Lift, Discrete	
Trier	√	√	√	Shallow(25-ft), D
	Peristaltic Pump	(7.2.5)	√	Shallow(25-ft), D
0.1-0.5	N	√	√Depth, Discrete	
	Centrifugal Sub. Pump	(7.2.6)	Depth, Discrete	
	RGear Drive Pump	(7.2.7)	Depth, Discrete	
	Gear Drive Pump	(7.2.7)	Depth, Discrete	
Thin Walled Tube	√	(7.2.8)	Depth, Discrete	
Surface Water	Progressing Cavity Pump	(7.2.8)	Depth, Discrete	
√	•	0.5-5.0	S/WDepth, Discrete	
	Bacon Bomb	(7.4.1)	Depth, Discrete	
	√	√	R	
	Kemmerer	(7.4.2)	Depth, Discrete	
Coring Type w/Valve	√	√	√Depth, Discrete	
	Discrete Level	(7.4.5)	Depth, Discrete	
	0.2-1.5	N	√Shallow (12-ft), Discrete	
	Plunger Type	(7.8.4)	Shallow (12-ft), Discrete	
	√	R(7.8.5)	Shallow, Composite	
	Liquids Profiler	(7.8.5)	Shallow, Composite	
Miniature Core Sampler	√	√	√Shallow (10-ft.), Composite	
	Dipper	(7.4.9)	Shallow (10-ft.), Composite	
	0.01-0.05	N	√Shallow (6-ft), Composite	
	Liquid Grab	(7.4.10)	Shallow (6-ft), Composite	
	√	D(7.4.11)	Shallow, (10-ft), Composite	
	Swing Jar	(7.4.11)	Shallow, (10-ft), Composite	
Modified Syringe Sampler	√	√	√	Shallow (1-in.),
	Spoon	(7.11.2)	√	Shallow (1-in.),
0.01-0.05	N	√	√	D
	Air/Gas Displacement	(7.2.2.1)	√	Depth, Di
Soft Sediment Sampler	√	√	√Depth, Discrete	
	Piston Displacement	(7.2.2.2)	Depth, Discrete	
	1.6-7.0	N	√Depth, Discrete	
	Bladder Pump	(7.2.3)	Depth, Discrete	
	√	R(7.2.4)	Depth, Discrete	
	Corrugated Bladder Pump	(7.2.4)	Depth, Discrete	
Rotating Coring Devices			25-ft Lift, Discrete	
	Peristaltic Pump	(7.2.5)	25-ft Lift, Discrete	
			Depth, Discrete	
	Centrifugal Sub. Pump	(7.2.6)	Depth, Discrete	
	Gear Drive Pump	(7.2.7)	Depth, Discrete	
Screw Auger	√	(7.2.8)	Depth, Discrete	
	Progressing Cavity Pump	(7.2.8)	Depth, Discrete	
Ground Water	Inertia Lift Pump	(7.2.9)	Depth Discrete	
√	•	0.1-0.3	NDepth, Discrete	
	Discrete Level	(7.4.5)	Depth, Discrete	
	•	√	R	
	Direct Push Water Sampler	(7.5.1.1)	Depth, Discrete	
Rotating Coring Device	√	√	•Depth, Composite	
	Bailer	(7.4.6)	Depth, Composite	
	0.5-1.0	B/P	√Depth, Discrete	
	Point Sampling Bailer	(7.4.7)	Depth, Discrete	
	√	R(7.4.8)	Depth, Discrete	
	Diff. Pressure Bailer	(7.4.8)	Depth, Discrete	
Augering Devices			Depth Discrete	
	Bag Type Diffusion	(7.9.1)	Depth Discrete	
			Multiple Depths, Discrete	
	Chamber Type Diffusion	(7.9.2)	Multiple Depths, Discrete	
		(7.10.1)	Multiple Depths, Discrete	
	Dedicated Multi-Level	(7.10.1)	Multiple Depths, Discrete	
Bucket Auger	√	(7.10.2)	Multiple Depths, Discrete, Pore water	
	Portable Multi-Level	(7.10.2)	Multiple Depths, Discrete, Pore water	
√	•	0.2-1.0	NShallow (25-ft), Discrete or Composite	
	AutoSplr. -Non Vols.	(7.2.1)	Shallow (25-ft), Discrete or Composite	
	•	√	R	
	Auto Splr. - Vols.	(7.2.1)	Shallow (25-ft), Discrete	

TABLE 3 *Continued*

EquMedia Typment	ChemicSampler Type	PhysiSecaltion	Effect onSample Type	
Flighted Auger	•	√	•Shallow (25-ft), Discrete	
	Peristaltic Pump	(7.2.5)	Shallow (25-ft), Discrete	
	U	P/S/W	•	
	Centrifugal Sub. Pump	(7.2.6)	•	
Captive Screw Auger	√	√	√Depth, Discrete	
	Gear Drive Pump	(7.2.7)	Depth, Discrete	
	1-2	P	√	
	Progressing Cavity Pump	(7.2.8)	√	
Peat Borer	√	√	√Depth, Discrete	
	Bacon Bomb	(7.4.1)	Depth, Discrete	
	0.3	S	√	
	Kemmerer	(7.4.2)	√	
Liquid Profiling Devices			Shallow (8-ft), Discrete	
Liquid Effluent	Syringe Sampler	(7.4.3)	Shallow (8-ft), Discrete	
	Discrete Level	(7.4.5)	Depth, Discrete	
COLIWASA	√	•	√Shallow (8-ft), Discrete	
	Reuseable Point	(7.8.1.2)	Shallow (8-ft), Discrete	
	0.5-3.0	N		
	Valved Sampler	(7.8.3)	Shallow, Discrete	
	√	•	D/R	
	Plunger Type	(7.8.4)	Shallow (12-ft), Discrete	
	Reuseable Point Sampler	√	√Shallow, Composite	
	Liquids Profiler	(7.8.5)	Shallow, Composite	
	√	0.2-0.6	NShallow (10-ft), Composite	
	Dipper	(7.4.9)	Shallow (10-ft), Composite	
	√	√	R	
	Liquid Grab	(7.4.10)	Shallow (6-ft), Composite	
	Drum Thief	√	•Shallow (10-ft), Composite	
	Swing Jar	(7.4.11)	Shallow (10-ft), Composite	
	√	0.1-0.5	NShallow (1-in.), Composite	
	Spoon	(7.11.2)	Shallow (1-in.), Composite	
	√	•	D/R	
	Air Displacement Pump	(7.2.2.1)	Depth, Discrete	
Valved Drum Sampler	√	√	√Depth, Discrete	
	Piston Displacement	(7.2.2.2)	Depth, Discrete	
	0.3-1.6	N	√Depth, Discrete	
	Bladder Pump	(7.2.3)	Depth, Discrete	
	√	(7.2.4)	D/R	
	Corrugated Bladder Pump	(7.2.4)	Depth, Discrete	
Plunger Type Sampler	√	•	√	Shallow (25-f
	Peristaltic Pump	(7.2.5)	√	Shallow (25-f
0.2 U	N	√	√Depth, Discrete	
	Centrifugal Sub. Pump	(7.2.6)	Depth, Discrete	
	D/Rrive Pump	(7.2.7)	Depth, Discrete	
	Gear Drive Pump	(7.2.7)	Depth, Discrete	
Liquids Profiler	•	(7.2.8)	Depth, Discrete	
	Progressing Cavity Pump	(7.2.8)	Depth, Discrete	
√	√	1.3-4.0	NShallow (8-ft), Discrete	
	Syringe Sampler	(7.4.3)	Shallow (8-ft), Discrete	
	√	√	R	
	Lidded Sludge/Water	(7.4.4)	Shallow (8-ft), Discrete	
Surface Sampling Devices (Liquids)			Depth, Discrete	
	Discrete Level	(7.4.5)	Depth, Discrete	
Liquid			Depth, Discrete	
Liquid	Direct Push Water Sampler	(7.5.1.1)	Depth, Discrete	
		(7.8.1)	Shallow (4-ft), Composite	
	COLIWASA	(7.8.1)	Shallow (4-ft), Composite	
Bailer	•	√	•Shallow (8-ft), Discrete	
	Reuseable Point	(7.8.1.2)	Shallow (8-ft), Discrete	
	0.5-2.0	N	√Shallow, (12-ft), Discrete	
	Plunger Type	(7.8.4)	Shallow, (12-ft), Discrete	
	√	D/R(7.8.5)	Shallow, Composite	
	Liquids Profiler	(7.8.5)	Shallow, Composite	
Point Sampling Bailer	•	√	√	Shallow (3-ft
	Drum Thief	(7.8.2)	√	Shallow (3-ft
0.5-2.0	N	√	√	
	Valved Sampler	(7.8.3)	√	RShallow (8
Differential Pressure Bailer	√	√	√Depth, Discrete	
	Bailer	(7.4.6)	Depth, Discrete	
	0.04-1.0	N	√Depth, Discrete	
	Point Sampling Bailer	(7.4.7)	Depth, Discrete	
	√	R(7.4.8)	Depth, Discrete	

TABLE 3 *Continued*

Equ Media Typment	Chemie Sampler Type	Physi Secaltion	Effect on Sample Type	
	Diff. Pressure Bailer	(7.4.8)	Depth, Discrete	
	Dipper	√	√Shallow (10-ft), Composite	
	Dipper	(7.4.9)	Shallow (10-ft), Composite	
	√	0.5-1.0	NShallow (6-ft), Composite	
	Liquid Grab	(7.4.10)	Shallow (6-ft), Composite	
	√	√	R	
	Swing Jar	(7.4.11)	Shallow, (10-ft), Composite	
Liquid Grab Sampler	√	√	√Shallow (1-in.), Composite	
	Spoon	(7.11.2)	Shallow (1-in.), Composite	
	0.5-1.0	N	√Shallow, (1-in.), Composite	
	Scoops & Trowel	(7.11.3)	Shallow, (1-in.), Composite	
	√	R(7.2.2.1)	Depth, Discrete	
	Air Displacement Pump	(7.2.2.1)	Depth, Discrete	
	Swing Jar Sampler	•	√Depth Discrete	
	Piston Displacement	(7.2.2.2)	Depth Discrete	
	√	0.5-1.0	NDepth, Discrete	
	Bladder Pump	(7.2.3)	Depth, Discrete	
	√	√	R	
	Corrugated Bladder Pump	(7.2.4)	Depth, Discrete	
Passive Sampler, Bag Type	√	√	√Shallow(25-ft), Discrete	
	Peristaltic Pump	(7.2.5)	Shallow(25-ft), Discrete	
	0.1-0.2	N	√	√
	Centrifugal Sub. Pump	(7.2.6)	√	√
Passive Sampler, Chamber Type	√	√	√Depth, Discrete	
	Gear Drive Pump	(7.2.7)	Depth, Discrete	
	1-4	W/S	•	•
	Progressing Cavity Pump	(7.2.8)	•	•
Surface Sampling Devices (Solids)				
Multi Layer	Syringe Sampler	(7.4.3)	Shallow (8-ft), Discrete	
Impact Devices	•	•	•Depth, Discrete	
Liquid	Discrete Level	(7.4.5)	Depth, Discrete	
	N/A	B/P	√Depth, Discrete	
	Direct Push Water Sampler	(7.5.1.1)	Depth, Discrete	
	√	R(7.8.1)	Shallow (4-ft), Composite	
	COLIWASA	(7.8.1)	Shallow (4-ft), Composite	
Spoon	√	√	•Shallow (8-ft), Discrete	
	Reuseable Point	(7.8.1.2)	Shallow (8-ft), Discrete	
	N/A	N	√Shallow, (12-ft), Discrete	
	Plunger Type	(7.8.4)	Shallow, (12-ft), Discrete	
	√	R(7.8.5)	Shallow, Composite	
	Liquids Profiler	(7.8.5)	Shallow, Composite	
Scoops and Trowel	√	√	•	Shallow (3-ft), C
	Drum Thief	(7.8.2)	•	Shallow (3-ft), C
0.1-0.6	N	√	√	R
	Valved Sampler	(7.8.3)	√	RShallow (8-ft)
Shovels	√	√	•Depth, Discrete	
	Bailer	(7.4.6)	Depth, Discrete	
	1.0-5.0	N	√Depth, Discrete	
	Point Sampling Bailer	(7.4.7)	Depth, Discrete	
	√	R		
	Diff. Pressure Bailer	R		
Multi-Level Sampling Devices				
Multi-Level Sampling Devices(7.4.8)	Depth, Discrete			
Dedicated Type 1	√	√	√	U
	Dipper	(7.4.9)	√	U
Dedicated Type 2	√	√	√	U
	Liquid Grab	(7.4.10)	√	U
Portable	√	√	√	0.01
	Swing Jar	(7.4.11)	√	0.01

• =Significant operation consideration
√ = Not a significant operational consideration

Range of Volume (liters) U = Unlimited
N/A = Not Applicable

Physical Requir
B = Battery W
P = Power S =
N = No limitatio

Shal consideration

Range of Volow (10-ft), Cot Applicable

Physical Requir
B = Battery W
P = Power S =
N = No limitatio