United States
Environmental Protection
Agency

Environmental Monitoring and
Support Laboratory
Cincinnati OH 45268

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Research and Development

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Addendum to Handbook for Sampling and Sample Preservation, EPA-600/4-82-029

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING AND SUPPORT LABORATORY
CINCINNATI, OHIO 45268

DATE: June 20, 1983

SUBJECT: Addendum to "Handbook for Sampling and Sample Preservation of Water and Wastewater," EPA-600/4-82-029, September 1982

FROM: Robert L. Booth, Acting Director R.L. Booth
Environmental Monitoring and Support
Laboratory - Cincinnati

TO: QA Newsletter Mailing List

In September 1982, we published a manual entitled "Handbook for Sampling and Sample Preservation of Water and Wastewater." By January 1983, all copies of the report were depleted, but requests for copies were still being made. Also, based on comments received by us, it became apparent that certain parts of the report should be updated and distributed as rapidly as possible to fill the needs of the user community. Recognizing that a reprinting would take a considerable length of time, it was decided to include the critical updated items to you in this manner.

Critical items changed were:

1. the definitions of various sampling procedures
2. current literature references
3. Table 2.3 in the manual

Table 2.3 illustrates automatic samplers and characteristics, and has been updated to April 1983 by requesting that the manufacturers review the old information and update where necessary. Because of the volume of information generated and space limitations, it was necessary to expand Table 2.3 into three sub-tables, A, B, and C.

We trust that you will find this updated information of value to you in your environmental monitoring activities. Specific questions or comments may be addressed to Mr. Joseph F. Roesler whose commercial telephone number is (513) 684-7286 and his FTS number 684-7286.

TABLE 2.3A AUTOMATIC SAMPLERS
General Description

Manufacturer	Model	Approx. Cost ($)	Portable or Fixed	Weight kg(lb)	Dimensions wdth x dpth x hgth or dia x hgth (cm)	Power	Solid State
BIF Sanitrol	41-2	1000	F			AC	X
12449 Enterprise Blvd.	41-3	1200	F			AC	X
Largo, FL 33543	41-11	1350	F			AC	X
	41-12	1024	F			AC	X
	43-01	2500	F			AC	X
	46	1900	P/F			AC/DC	X
BVS	PP-100	1350	P	17(37)	35x35x55	*	Pneu.
Rte. 322, West & Poplar	PPR-100	1750	P	23(51)	35x35x55	AC/DC*	Pneu.
Honey Brook, PA 19344	PE-400	1950	P	16(35)	35x35x45	AC	X
	PE-500	2150	P	16(35)	35x35x45	AC	X
	PPE-400	1900	P	16(35)	35x35x45	AC/*	X
	PPE-500	2100	P	16(35)	35x35x45	AC/*	X
	PER-400	2550	F	36(79)	53x53x134	AC	X
	PER-500	2750	F	36(79)	53x53x134	AC	X
	PPER-400	2500	F	36(79)	53x53x134	AC/*	X
	PPER-500	2700	F	36(79)	53x53x134	AC/*	X
	SPE-400	3900	F	102(225)	66x76x142	AC/*	X
	SPE-500	4100	F	102(225)	66x76x142	AC/*	X
	SPE-400M	4300	F	114(251)	66x106x142	AC/*	X

*Pressure source of Freon-12, Nitrogen, Compressed Air or optional built-in oil-less diaphragm compressor.

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General Description

Manufacturer	Model	Approx. Cost ($)	Portable or Fixed	Weight kg(lb)	Dimensions wdth x dpth x hgth or dia x hgth (cm)	Power	Solid State
American Sigma 1 Elizabeth Street Middleport, NY 14105	6200	1250	P	12.7(28)	37x36x51	AC/DC	X
	6300	1860	F	63.6(140)	61x61x103	AC	X
	6201	1795	P	16(35)	37x36x51	AC/DC	X
	6301	2475	F	63.6(140)	61x61x103	AC	X
	600	2100	P	17.9(39)	49.5x43	AC/DC	X
	1600	2750	F	81.8(180)	69x69.122	AC	X
Badger Meter 6116 E. 15th St. Tulsa, OK 74112	QC77	1369	P	15(33)	36x41x38	DC	X
	QC80	1919	P	17(37)	36x41x38	DC	X
Barnant 28 W. 092 Commercial Ave Barrington, IL 60010	7578-10	955	P	12.5(27)	43x25x65	DC	X
	7570-00	495	P	6.8(15)	28x18x20	DC/AC	X
Brailsford 670 Milton Road Rye, NY 10580	DC-F	390	P	8.7(19)	53x31x24	DC	X
	DU-2A	510	P	8.7(19)	53x31x24	DC	X
	FV-1	765	P	10.9(24)	53x31x24	DC	X
	FV-2	699	P	10.9(24)	53x31x24	AC	X
	FV-3	815	P	10.9(24)	53x31x24	AC/DC	X
Bristol 210 Beaver St. Yorkville, IL 60560	Isolok M-4	2500	F	11(24)	5x20	Air/AC	X

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Manufacturer	Model	Approx. Cost ($)	Portable or Fixed	Weight kg(lb)	Dimensions wdth x dpth x hgth or dia x hgth (cm)	Power	Solid State
	SPE-500M	4500	F	114(251)	66x106x141	AC/*	X
	SE-400	3950	F	104(229)	66x76x142	AC	X
	SE-500	4150	F	104(229)	66x76x142	AC	X
	SE-800	5500	F	116(255)	66x76x142	AC	X
	SPE-800	5750	F	116(255)	66x76x142	AC/*	X
	PE-400WM	1350	F	20(44)	50x25x50	AC	X
	PE-500WM	1500	F	20(44)	50x25x50	AC	X
	PPE-400WM	1300	F	18(40)	50x25x50	AC/*	X
	PPE-500WM	1550	F	18(40)	50x25x50	AC/*	X
Capital Controls Box 211 Colmar, PA 18915	3110	3900	F	102(225)	66x76x142	AC	X
	3120	3850	F	102(225)	66x76x142	AC/Air	X
Collins Products P.O. Box 382 Livingston, TX 77351	42	2335	F	34-64(75-141)	140x76x61	AC	X
	45	2415	F	34-64(75-141)	140x76x61	AC	X
	47	2585	F	34-64(75-141)	117x51x51	AC	X
	48	2560	F	34-64(75-141)		AC	X
	50	2810	F	34-64(75-141)	152x76x61	AC	X
Delta Controls 1611 Texas Ave. Shreveport, LA 71103	Type 224	1500	F	40(88)	15-25x5-56	Pneu.	X
	Type 223	3000	F	226(498)	91x61x61	AC	X
Fluid Kinetics 4859 Factors Drive Fairfield, OH 45014	Stream Guard System	1665	F	12(26)	67x31x17 31x20x19	AC	X

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FMC Corp. 3400 Walnut Street Colmar, PA 18915	Tru-Test	2500-3000	F	113(250)	49x53x132	AC	X
Hinds (Hydragard) P.O. Box 4327 Portland, OR 97208	HP-1	600-900	P or F	4.5(10)		AC	
	HP-2	600-900	P or F	4.5(10)		AC	
	PL-HP1	1600-2000	F	7(15)		AC	
	PL-1	700-1100	F	10(22)		AC	
	TS	1000	F			AC	
	A-1	600-900	P or F	10(22)		AC	
	A-2	600-900	P or F	9.5(21)		AC	
	FP-1	800-1200	P or F	10.5(23)		AC	
	FP-2	800-1200	P or F	10.5(23)		AC	
	FP-3	800-1200	P or F	10.5(23)		AC	
	FP-4	800-1200	P or F	10.5(23)		AC	
	Traversing Model*	400	P or F	5(11)		AC	
Horizon Ecology 7435 North Oak Park Dr. Niles, IL 60648	7578-10	955	P	12.5(27)	43x25x65	AC+DC	X
	Ref. Unit	1180	F	18(40)	47x49x33	AC	X
	7570-00	495	P	6.8(15)	28x18x20	DC/AC	X
ISCO, Environ. Div. 3621 N.W. 36th Street Lincoln, NE 68528	1580	1065	P	14.1(31)	48.5x64.8	AC/DC	X
	1580RW	2066	F	52.6(116)	62x65x108	AC	X
	1680	1675	P	18.1(40)	49.5x53	AC/DC	X
	1680 RW	2445	F	52.6(116)	62x65x108	AC	X
	2100	2125	P	18.2(40)	49.5x63.5	AC/DC	X
	2100	2065	P	18.2(40)	49.5x63.5	AC/DC	X

*Provides a stratified or cone sample of liquid stream or well

TABLE 2.3A AUTOMATIC SAMPLERS
General Description

Manufacturer	Model	Approx. Cost ($)	Portable or Fixed	Weight kg(lb)	Dimensions wdth x dpth x hgth or dia x hgth (cm)	Power	Solid State
Ivek 43 School Street North Springfield, VT 05150	D101 Digisampler	1900	F	11(24)	36x27x11.4	AC	X
Kahl P.O. Box 1166 El Cajon, CA 92022	216WA165	6790	F	80(176)	90.4x152.4x198	AC/DC	X
Krofta 58 Yokun Avenue Lenox, MA 01240	PN-2	1200	F	8(18)	15x56	Air/AC	X
	PF-2	1400	F	10(22)	15x96	Air/AC	X
	Portable	1200	P	12(26)	30x20x36	AC/DC	X
Lakeside 1022 East Devon Ave. Bartlett, IL 60103	T-2	2040	F	36(79)	25.4x51x51	AC	
	T-9	1950	F	18(40)	25.4x51x51	AC	
Manning 100 Technology Circle Santa Cruz, CA 95066	S-4040	1730	P	16(35)	48x57	AC/DC	X
	S-5000	2775	F	72.6(160)	61x44x143	AC	X
	S-5200	4395	F	90.8(200)	61x44x143	AC	X
	S-6000	3565	F	79.5(175)	61x64x143	AC	X
	S-4400	2175	P	18.3(40)	50.4x81.8	AC/DC	X
	S-4500	2495	P	18.3(40)	50.4x81.8	AC/DC	X
	S-3300	1450	P	17.3(38)	50.4x81.8	AC/DC	X

TABLE 2.3A AUTOMATIC SAMPLERS
General Description

Manufacturer	Model	Approx. Cost ($)	Portable or Fixed	Weight kg(lb)	Dimensions wdth x dpth x hgth or dia x hgth (cm)	Power	Solid State
Markland	1401	2695	P	15(33)	47.6x48.3	DC	X
Box 145	1301CD	1775	P	22(49)	43x30.71	DC	X
Etobicoke, Ontario	105	1415	F	6.8(15)	15x10x15	AC	X
Canada	2105	1715	F	13.6(30)	15x10x15	AC	X
Monitek	MSR-1200	2700	F	90(198)	98x57x61	AC	X
NB Instruments	WS-1000P	1940	P	10(22)	40x30x19	DC	X
935 Horsham Rd. Horsham,, PA 19044	WS-1000	1850	F	11(24)	36x30x15	AC	X
N-CON	Sentinel 8CXM	2950	F	43.2(95)	36x36x91	AC	
308 Main Street Clean Waters Bldg. New Rochelle, NY 10801	Scout C	895	P/F	7.7(17)	36x20x43	AC/DC	X
	Scout CTX	925	P/F	7.7(17)	36x36x91	AC/DC	X
	ASM	550	P/F	4.1(9)	20x15x25	AC/DC	X
	ASM/24	1450	P/F	4.1(9)	20x15x25	AC/DC	X
	CUB	425	P	5(11)	25x15x31	DC	X
	Trebler	1400	F	Varies	Varies	AC	
Crane Co./Pro-Tech	CG-125	1696	P	9(20)	33x22.9x43.2	Press.	X
800 Third Avenue	CG-190	2000	P	14(31)	33.22.9x43.2	AC	X
King of Prussia, PA	CEG-200	2700	P	15(33)	33.48.3x43.2	AC	X
19406	CEL-300	3000	P	10(22)	33x48.3x43.2	AC	X
	CEL-300SO	5500	F	63.5(140)	76.2x66x152.4	AC	X
	CEG-200SO	5300	F	75(165)	68.6x66x127	AC	X
	DEL-400S	8600	F	154(340)	76.2x81x183	AC	X

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Manufacturer	Model	Approx. Cost ($)	Portable or Fixed	Weight kg(lb)	Dimensions wdth x dpth x hgth or dia x hgth (cm)	Power	Solid State
QCEC	CVE-D	980	P	24.9(55)	38x38x61	AC	X
1916 Dean, Box 6010	CVE-77	1085	P	15(33)	36x38x41	AC/DC	X
Des Moines, Iowa 50309	CVE-81	1130	P	24.9(55)	38x38x66	AC	X
	Century 2000	1400	P	19(42)	38x38x66	AC/DC	X
	E	1740	F	45.4(100)	Varies	AC	X
	LF	1435	F	10(22)	40x8	AC/DC	X
Sirco	B/VS Series	2300	F	132(291)	63x65x160	AC	X
8815 Selkirk St.							
Vancouver, B.C. V6P 457	B/VS Series	2300	F	132(291)	63x65x160	AC	X
	B/IE-VS	2300	F	123(271)	39x32x16	AC	
Sonford	NW-3	1400	P	25(53)	39x39x68	Spring	X
905 N. Fifth Ave.	TC-2	3600-8500	F	70(154)	96x60x86	AC/Air	X
Minneapolis, MN 55401							

TABLE 2.3B AUTOMATIC SAMPLERS
Sampler Size and Construction

Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
American Sigma 1 Elizabeth Street Middleport, NY 14105	6200	1	10000	Ice	Glass or Polyethy.	Silicon & Tygon	Teflon, S.S.
	6300	1	18926	Ref	Glass or Polyethy.	Silicon & Tygon	Teflon, S.S.
	6201	1 24	10000 475	Ice	Glass or Polyethy.	Silicon & Tygon	Teflon, S.S.
	6301	1 24	18296 1500	Ref	Glass or Polyethy.	Silicon & Tygon	Teflon, S.S.
	600	1 24	10000 1500	Ice	Boroslcte glass or Polyethy.	Silicon[1] and Teflon	Teflon,S.S.
	1600	1	18926	Ref	Glass or Polyethy.	S.S. S.S.	
Badger Meter 6116 E. 15th St. Tulsa, OK 74112	QC77	1	3785	Ice	Glass		
	QC80	1	3785	Ice	Glass		
Barnant 28 W. 092 Commercial Ave. Barrington, IL 60010	7578-10	1	9463	None	Polyethy.	Silicon[1]	S.S. Silicon[1]
	7570-00	User Supplied	User Supplied	None	-	Silicon[1]	-

[1] Uses Dow Corning medical grade silicon rubber

TABLE 2.3B AUTOMATION SAMPLERS
Sampler Size and Construction

Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
Brailsford 670 Milton Road Rye, NY 10580	DC-F	1	7571	None	Polyethy.	Vinyl	Teflon, S.S. Neoprene
	DU-2A	1	7571	None	Polyethy.	Tygon	Teflon, S.S. Neoprene
	FV-1	1	7571	None	Polyethy.	Tygon	Plastic
	FV-2	1	7571	None	Polyethy.	Tygon	Plastic
	FV-3	1	7571	None	Polyethy.	Tygon	Plastic
Bristol 210 Beaver St. Yorkville, IL 60560	IsoLok M-4	1	3785	Ref/Opt S.S.	Plastic Glass		S.S. Polyurethane TFE Elastomer
BIF Sanitrol 12449 Enterprise Blvd. Largo, FL 33543	41-2	1	18927	Ref/Opt	Plastic	Plastic	Fiberglass
	41-3	1	18927	Ref/Opt	Plastic	Plastic	S.S.
	41-11	1	18927	Ref/Opt	Plastic	Plastic	S.S.
	41-12	1	18927	Ref/Opt	Plastic	Plastic	Fiberglass
	43-01	1	18927	Ref/Opt	Plastic	Plastic	Plastic
	46	1	18927	Ref/Opt	Plastic	Plastic	Plastic

TABLE 2.3B AUTOMATION SAMPLERS
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Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
BVS	PP-100	1	9463	None	Polyethy.	Tygon	PVC,TFE,Nylon
Rte. 322, West & Poplar	PPR-100	1	9463	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
Honey Brook, PA 19344	PE-400	1	18925	None	Polyethy.	Tygon	PVC,TFE,Nylon
	PE-500	1	18925	None	Polyethy.	Tygon	PVC,TFE,Nylon
	PPE-400	1	9463	None	Polyethy.	Tygon	PVC,TFE,Nylon
	PPE-500	1	9463	None	Polyethy.	Tygon	PVC,TFE,Nylon
	PER-400	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	PER-500	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	PPER-400	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	PPER-500	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	SPE-400	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	SPE-500	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	SPE-400M	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	SPE-500M	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	SE-400	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	SE-500	1	18925	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	SE-800	24	500	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	SPE-800	24	500	Ref.	Polyethy.	Tygon	PVC,TFE,Nylon
	PE-400WM	1	18925	None	Polyethy.	Tygon	PVC,TFE,Nylon
	PE-500WM	1	18925	None	Polyethy.	Tygon	PVC,TFE,Nylon
	PPE-400WM	1	18925	None	Polyethy.	Tygon	PVC,TFE,Nylon
	PPE-500WM	1	18925	None	Polyethy.	Tygon	PVC,TFE,Nylon

*Pressure source of Freon-12, Nitrogen, Compressed Air or optional built-in oil-less diaphragm compressor.

TABLE 2.3B AUTOMATION SAMPLERS
Sampler Size and Construction

Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
Capital Controls Box 211 Colmar, PA 18915	3110	1	18927	Ref	Polyethy.	Nylon/ PVC	Baked Epoxy
	3120	1	18927	Ref.	Polyethy.	Nylon PVC	TFE
Collins Products P.O. Box 382 Livingston, TX 77351	42	1	9463	Ref/Opt	Polyethy.	Tygon	S.S. PVC
	45	1	9463	Ref/Opt	Polyethy.	Tygon	S.S. PVC
	47	1	9463	Ref/Opt	Polyethy.	Tygon	S.S. PVC
	48	1	9463	Ref/Opt	Polyethy.	Tygon	S.S. PVC
	49	1	9463	Ref/Opt	Polyethy.	Tygon	S.S. PVC
Delta Controls 1611 Texas Ave. Shreveport, LA 71103	Type 224	1	U(Opt)	Ref/Opt	Glass(Opt)		S.S. Butyl Rub.
	Type 223	1	U(Opt)	Ref/Opt	Glass(Opt)		S.S.
Fluid Kinetics 4859 Factors Drive Fairfield, OH 45014	Stream Guard Stream	1	9463	Ref/Opt	PVC	Tygon	Silicone S.S.
FMC Corp. 3400 Walnut Street Colmar, PA 18915	True Test	1	7500(2)	Ref/Opt	Polyethy.		Fiberglass

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Sampler Size and Construction

Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
Hinds (Hydragard) P.O. Box 4327 Portland, OR 97208	HP-1	1	18927	Ref/Opt	Polyethy.	Vinyl Polyethy.	Teflon, S.S. Neoprene
	HP-2	1	18927	Ref/Opt	Polyethy.	Vinyl Polyethy.	Teflon, S.S. Neoprene
	PL-HP1	1	18927	Ref/Opt	Polyethy.	Plastic	S.S.
	PL-1	1	18927	Ref/Opt	Polyethy.	PVC Vinyl	S.S.
	TS	1	18927	Ref/Opt	Glass		Teflon
	A-1	1	18927	Ref/Opt	Polyethy.	PVC Vinyl	Teflon Neoprene
	A-2	1	18927	Ref/Opt	Polyethy.	PVC Vinyl	Teflon Neoprene
	FP-1	1	18927	Ref/Opt	Polyethy.	Polyethy.	Teflon Neoprene
	FP-2	1	18927	Ref/Opt	Polyethy.	Polyethy.	Teflon Neoprene
	FP-3	1	18927	Ref/Opt	Polyethy.	Polyethy.	Teflon Neoprene
	FP-4	1	18927	Ref/Opt	Polyethy.	Polyethy.	Teflon Neoprene
	Traversing Model[1]	1	18927	Ref/Opt	Polyethy.	Polyethy.	Teflon Neoprene
Horizon Ecology 7435 North Oak Park Drive Niles, IL 60648	7578-10	1	9463	None	Polyethy.	Silicon[2]	S.S.
	Ref. Unit	1	9462	Ref	Polyethy.	Silicon[2]	Silicon[2]
	7570-00	User Supplied	User Supplied	None	-	Silicon[2]	-

1. Provides a stratified or cone sample of liquid stream or well
2. Uses Dow Corning medical grade silicon rubber.

TABLE 2.3B AUTOMATION SAMPLERS
Sampler Size and Construction

Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
ISCO, Environ. Div. 3621 N.W. 36th Street Lincoln, NE 68528	1580	1	11356[1]	Ice	Polyethy. or Glass	Tygon or Teflon	Silicone[2]
	1580RW	1	11356[1]	Ref.	Polyethy. or Glass	Tygon or Teflon	Silicone[2]
	1680	28	500-400	Ice	Polyethy. or Glass	Tygon	Silicone[2]
	1680 RW	28	500-400	Ref.	Polyethy. or Glass	Tygon	Silicone[2]
	2100	24	350	Ice	Glass	Teflon	Silicone[2]
	2100	24	1000	Ice	Polyethy.	Tygon	Silicone[2]
Ivek 43 School Street North Springfield, VT 05150	D101 Digisampler	User Provided	User Provided	None	User Bottle	Teflon or Tygon	Teflon Ceramic
Kahl P.O. Box 1166 El Cajon, CA 92022	216WA165	72	1000	None	Plastic	Plastic	
Krofta 58 Yokun Avenue Lenox, MA 01240	PN-2	1	Opt.	Ref/Opt	Opt.	Ex. PVC	S.S.
	PF-2	1	Opt.	Ref/Opt	Opt.	Ex. PVC	S.S.
	Portable	1	13249	Ref/Opt	PVC	PVC	Brass,Rubber

1. Sampler container size may be 9.5 liter glass, 11.4 liter polyethylene or 18.9 liter polyethylene.
2. Uses Don Corning medical grade silicone rubber.

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Sampler Size and Construction

Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
Lakeside 1022 East Devon Ave. Bartlett, IL 60103	T-2	1	7571	Ref/Opt	Polyethy.	Plastic	Plexiglass
	T-9	1	7571	Ref/Opt	Polyethy.	Plastic	Plexiglass
Manning 100 Technology Circle Santa Cruz, CA 95066	S-4040	24	500	Ice	Polyethy.	Tygon	Plexiglass
	S-5000	1	11356 18927	Ref.	Polyethy. Glass	Tygon	PVC
	S-5200	2	11356 18927	Ref.	Glass Polyethy.	Tygon	PVC
	S-6000	24	1000	Ref.	Polyethy.	Tygon	Plexiglass
	S-4400	24	500	Ice	Polyethy.	Tygon	Plexiglass
	S-4500	24	500	Ice	Polyethy.	Tygon	Plexiglass
	S-3300	1	11356 18927	Ice	Glass, Polyethy.	Tygon	Plexiglass
Markland Box 145 Etobicoke, Ontario Canada	1401	24	500	Ref/Opt	Polyethy.HD	Flex.PVC	Rubber
	1301CD	1	7500	Ref/Opt	Polyethy.	Flex.PVC	Rubber
	105	1	7500	Ref/Opt	Polyethy.	Flex.PVC	Alum.
	2105	1	7500	Ref/Opt	Polyethy.	Flex.PVC	Alum. (SS-PVC/Opt)
Monitek	MSR-1200	1	18925	Ref	Polyprop.	Fiber glass Tygon	Lucite
NB Instruments 935 Horsham Rd. Horsham,, PA 19044	WS-1000P	1	378-1135	Ref/Opt	Polyethy.	Tygon Teflon/Opt	
	WS-1000	1	378-1892	Ref/Opt		Tygon Teflon/Opt	

TABLE 2.3B AUTOMATION SAMPLERS
Sampler Size and Construction

Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
N-CON 308 Main Street Clean Waters Bldg. New Rochelle, NY 10801	Sentinel 8CXM	1	7571	Thermoelec.	Polypropyl.	PVC	Acrylic
	Scout C	1	3785	None	Polypropyl.	Vinyl	Silicone
	Scout CTX	1	3785	None	Glass	Teflon	Silicone
	ASM	1	9463	Ref/Opt	Glass Polypropyl.	Vinyl Teflon	Silicone
	ASM/24	24	500	Ref/Opt	Polypropyl.	Vinyl Teflon	Silicone
	CUB	1	7571	None	Polyethyl.	Vinyl Teflon	Silicone
	Trebler	1	7571	Ref/Opt	Polyethyl.	Tygon	PVC
Crane Co./Pro-Tech 800 Third Avenue King of Prussia, PA 19406	CG-125	1	5678	Ref/Opt	Polyethyl.	Polyethyl.	
	CG-190	1	5678	Ref/Opt	Polyethyl.	Polyethyl.	
	CEG-200	1	5678	Ref/Opt	Polyethyl.	Polyethyl.	
	CEL-300	1	5678	Ref/Opt	Polyethyl.	PVC	
	CEL-300SO	1	5678	Ref	Polyethyl.	PVC	
	CEG-200SO	1	5678	Ref	Polyethyl.	Polyethyl.	
	DEL-400S	24	500	Ref	Polyethyl.	Polyethyl.	
QCEC 1916 Dean, Box 6010 Des Moines, Iowa 50309	CVE-D	1	3785	Ref/Ice	Glass	Tygon	Polypropyl.
	CVE-77	1	3785	Ref/Ice	Glass	Tygon	Polypropyl.
	CVE-81	1	18927	Ref/Ice	Glass	Tygon	Polypropyl.
	Century	1	18927 500	Ref/Ice	Glass	Tygon	Polypropyl.
	E	1	18927	Ref/Ice	Glass	Tygon	Polypropyl.
	LF	1	18927	Ref/Ice	Glass	Tygon	Polypropyl.

TABLE 2.3B AUTOMATION SAMPLERS
Sampler Size and Construction

Manufacturer	Model	Sample Containers No.	Sample Containers Cap (mL)	Type of Cooling	Materials in Contact with Sample: Bottles	Materials in Contact with Sample: Tubing	Materials in Contact with Sample: Other
Sirco 8815 Selkirk St. Vancouver, B.C. V6P 457	B/VS Series	1	7571-18927	Ref/Opt	Nalgene	Flex.PVC	Silicone
	B/VS Series	24	500-1000	Ref/Opt	Nalgene	Flex,PVC	Silicone
	B/IE-VS	1	7571-18927	Ref/Opt	Nalgene		SS-PVC
Sonford 905 N. Fifth Ave. Minneapolis, MN 55401	NW-3	24	473	Ice	Glass	Vinyl	Rubber, S.S.
	TC-2	1	7571	Ref	Plastic	Plastic	Plastic

TABLE 2.3C AUTOMATIC SAMPLERS
OPERATIONAL CHARACTERISTICS

Manufacturer	Model	Gathering Method	Purge Cycle	Flow Prop	Timed Sample	Line Velocity (cm/sec)	Lift (M)	Size (mm)
American Sigma	6200	Peristaltic	X	X	X	61-91	7.9	6.4-9.5
1 Elizabeth Street Middleport, NY 14105	6300	Peristaltic	X	X	X		7.9	6.4-9.5
	6201	Peristaltic	X	X	X	61-91	7.9	6.4-9.5
	6301	Peristaltic	X	X	X	61-91	7.9	6.4-9.5
	600	Peristaltic	X	X	X	61-91	7.9	6.4-9.5
	1600	Dipper	X	X	X	--	--	
Badger Meter	QC 77	Vacuum	X	Opt	X	91-152	6.1	6.4-9.5
6116 E. 15th St. Tulsa, OK 74112	QC 80	Vacuum	X	Opt	X	91-152	6.1	6.4-9.5
Barnant	7578-10	Peristaltic	X	X	X	10	7.6	4.8
28 W. 092 Commercial Ave. Barrington, IL 60010	7570-00	Peristaltic				61	7.6	4.8
Brailsford	DC-F	Piston	None	None	None	2	1.8	6.4
670 Milton Road Rye, NY 10580	D4-2A	Piston	None	Opt.	Opt.	2	1.8	6.4
	FV-1	Vacuum	X	Opt.	Opt.	91	4.6	6.4
	FV-2	Vacuum	X	Opt.	Opt.	91	4.6	6.4
	FV-3	Vacuum	X	Opt.	Opt.	91	4.6	6.4

TABLE 2.3C AUTOMATIC SAMPLERS
OPERATIONAL CHARACTERISTICS

Manufacturer	Model	Gathering Method	Purge Cycle	Flow Prop	Timed Sample	Line Velocity (cm/sec)	Lift (M)	Size (mm)
Bristol 210 Beaver St. Yorkville, IL 60560	IsoLok M-4	Piston	None	Opt	X			
BIF Sanitrol 12449 Enterprise Blvd. Largo, FL 33543	41-2	Dipper	None	X	X		7.5	
	41-3	Dipper	None	X	X		7.5	
	41-11	Dipper	None	X	X		7.5	
	41-12	Dipper	None	X	X		7.5	
	43-01	Pump	None	X	X		9.0	
	46	Peristaltic	None	X	X		9.0	
BVS Rte. 322, West & Poplar Honey Brook, PA 19344	PP-100	Sub. Probe	X	None	X	110+(Adj.)	122	4.8
	PPR-100	Sub. Probe	X	None	X	110+(Adj.)	122	4.8
	PE-400	Sub. Pump	Cont	X	X	110	10	12.7
	PE-500	Sub. Pump	Cont	X	X	110	10	25.4
	PPE-400	Sub. Probe	X	X	X	110+(Adj.)	122	4.8
	PPE-500	Sub. Probe	X	X	X	110+(Adj.)	122	6.35
	PER-400	Sub. Pump	Cont.	X	X	110+	10	12.7
	PER-500	Sub. Pump	Cont.	X	X	110+	10	25.4
	PPER-400	Sub. Probe	X	X	X	110+(Adj.)	122	4.8
	PPER-500	Sub. Probe	X	X	X	110+(Adj.)	122	6.35
	SPE-400	Sub. Probe	X	X	X	110+(Adj.)	122	4.8
	SPE-500	Sub. Probe	X	X	X	110+(Adj.)	122	6.35
	SPE-400M	Sub. Probe	X	X	X	110+(Adj.)	122	4.8
	SPE-500M	Sub. Probe	X	X	X	110+(Adj.)	122	6.35
	SE-400	Sub. Pump	Cont.	X	X	110+	10	12.7
	SE-500	Sub. Pump	Cont.	X	X	110+	10	25.4
	SE-800	Sub. Pump	Cont.	X	X	110+	10	12.7
	SPE-800	Sub. Probe	X	X	X	110+(Adj.)	122	4.8
	PE-400WM	Sub. Pump	Cont.	None	X	110+	10	12.7
	PE-500WM	Sub. Pump	Cont.	None	X	110+	10	25.4
	PPE-400WM	Sub. Probe	X	None	X	110+(Adj.)	122	4.8
	PPE-500WM	Sub. Probe	X	None	X	110+(Adj.)	122	6.35

TABLE 2.3C AUTOMATIC SAMPLERS
OPERATIONAL CHARACTERISTICS

Manufacturer	Model	Gathering Method	Purge Cycle	Flow Prop	Timed Sample	Line Velocity (cm/sec)	Lift (M)	Size (mm)
Capitol Controls	3110	Submersible	Cont.	X	X	110	10	6.4
Box 211	3120	Pneumatic	X	X	X	24-95	122	12.7
Colmar, PA								
Collins Products	42	Vacuum/Pump	X	Opt.	Opt.		9	12.7-19.1
P.O. Box 382	45	Vacuum/Pump	X	Opt.	Opt.		9	38.1
Livingston, TX 77351	47	Vacuum/Pump	X	Opt.	Opt.		9	12.7-19.1
	48	Vacuum/Pump	X	Opt.	Opt.		9	12.7-19.1
	50	Vacuum	X	Opt.	Opt.		9	12.7-15.8
Delta Controls	Type 224	Piston	X	X	X	76	0.9-6.1	25.4
1611 Texas Ave.								
Shreveport, LA 77103	Type 223	Dipper		X	X		4.6	44.5
	Custom Designs							
Fluid Kinetics	Stream	Peristaltic	X	X	X	50	7.9	6.4
4859 Factors Drive	Guard							
Fairfield, OH 45014	System							
FMC Corp.	True Test	Dipper and	None	X	X	61	NA	7.6
3400 Walnut Street		External Head						
Colmar, PA 18915								

TABLE 2.3C AUTOMATIC SAMPLERS
OPERATIONAL CHARACTERISTICS

Manufacturer	Model	Gathering Method	Purge Cycle	Flow Prop	Timed Sample	Line Velocity (cm/sec)	Lift (M)	Size (mm)
Hinds (Hydragard) P.O. Box 4327 Portland, OR 97208	HP-1	Pneumatic	None	X	X		9	9.5
	HP-2	Pneumatic	None	X	X		9	9.5
	PL-HP1	Pneumatic	X	X	X		9	25.4
	PL-1	Pneumatic	None	X	X		9	25.4
	TS	Pneumatic	X	X	X			
	A-1	Pneumatic	None	X	X		9	9.5
	A-2	Pneumatic	None	X	X		9	9.5
	FP-1	Pneumatic	None	X	X		9	9.5
	FP-2	Pneumatic	None	X	X		9	9.5
	FP-3	Pneumatic	None	X	X		9	9.5
	FP-4	Pneumatic	None	X	X		9	9.5
	Traversing Model*	Pneumatic	None	X	X		9	9.5
Horizon Ecology 7435 North Oak Park Drive Niles, IL 60648	7578-10	Peristaltic	X	X	X	10	7.6	4.8
	Ref. Unit	Peristaltic	X	X	X	10	7.6	4.8
	7570-00	Peristaltic	-	-	-	61	7.6	4.8

*Provides a stratified or core sample of liquid stream or well.

TABLE 2.3C AUTOMATIC SAMPLERS
OPERATIONAL CHARACTERISTICS

Manufacturer	Model	Gathering Method	Purge Cycle	Flow Prop	Timed Sample	Line Velocity (cm/sec)	Lift (M)	Size (mm)
ISCO, Environ. Div. 3621 N.W. 36th Street Lincoln, NE 68528	1580	Peristaltic	X	X	X	<120[1]	7.9	6.4-9.5
	1580RW	Peristaltic	X	X	X	<120[1]	7.9	6.4-9.5
	1680	Peristaltic	X	X	X	<120[1]	7.9	6.4-9.5
	1680RW	Peristaltic	X	X	X	<120[1]	7.9	6.4-9.5
	2100	Peristaltic	X	X	X	<120[2]	7.9	6.4-9.5
	2100	Peristaltic	X	X	X	<120[2]	7.9	6.4-9.5
Ivek 43 School Street North Springfield, VT 05150	D101 Digisampler	Pump	Optional	X	X	<120	6.4 9.5	[illegible]
Kahl P.O. Box 1166 El Cajon, CA 92022	216WA165	Pump	X	Opt	Opt		6	12.7
Krofta 58 Yukun Avenue Lenox, MA 01240	PN-2	Pneumatic		X	X	300	9	12.7
	PF-2	Pneumatic		X	X	300	9	12.7
	Portable	Vacuum		X	X	9	7.6	6.4

1. Two pump speeds available: 1450 ml/min and 5000 ml/min at 3' of head.
2. Model 2100 pumps at 300 ml/min at 3' of head.

TABLE 2.3C AUTOMATIC SAMPLERS
OPERATIONAL CHARACTERISTICS

Manufacturer	Model	Gathering Method	Purge Cycle	Flow Prop	Timed Sample	Line Velocity (cm/sec)	Lift (M)	Size (mm)
Lakeside	T-2	Scoop		X	X		1	
1022 East Devon Avenue	T-9	Scoop		X	X		1	
Bartlett, IL 60103								
Manning	S-4040	Vacuum	X	X	X	>100	6.7	9.5
100 Technology Circle	S-5000	Vacuum	X	X	X	>100	6.7	16
	S-5200	Vacuum	X	X	X	>100	6.7	16
	S-6000	Vacuum	X	X	X	>100	6.7	16
	S-4400	Vacuum	X	X	X	>100	6.7	9.5
	S-4500	Vacuum	X	X	X	>100	6.7	9.5
	S-3300	Vacuum	X	X	X	>100	6.7	9.5
Markland	1401	Pneumatic	X	X	X	183	18	6.4
Box 145	1301CD	Pneumatic	X	X	X	183	18	6.4
Etobocoke, Ontario	105	Pneumatic	X	X	X	183	18	6.4
Canada	2105	Pneumatic	X	X	X	183	18	6.4
Monitek	MSR-1200	Vacuum	X	X	X	91-152	6	12.7
NB Instruments	WS-1000P	Peristaltic	X	X	X	143	7.3	6.4
935 Horsham Road	WS-1000	Peristaltic	X	X	X	143	7.3	6.4
Horsham, PA 19044								

TABLE 2.3C AUTOMATIC SAMPLERS
OPERATIONAL CHARACTERISTICS

Manufacturer	Model	Gathering Method	Purge Cycle	Flow Prop	Timed Sample	Line Velocity (cm/sec)	Lift (M)	Size (mm)
N-CON	Sentinel	External		VCTV	VCTC			
308 Main Street	8CXM	head dipper						
Clean Waters Bldg.	Scout C	Peristaltic	X	VCTV	VCTC	50	7.9	6.4
	Scout CTX	Peristaltic	X	VCTV	VCTC	50	7.9	6.4
	ASM	Peristaltic	X	VCTV	VCTC	50	7.9	6.4
	ASM/24	Peristaltic	X	VCTV	VCTC	50	7.9	6.4
	CUB	Peristaltic	X	NA	NA	50	7.9	6.4
	Trebler	Scoop			VVTC			
Pro-Tech	CG-125	Pneumatic	X	Opt	X	200	9.1	6.4
800 Third Avenue	CG-190	Pneumatic	X	X	X	200	91.4	6.4
King of Prussia, PA 19406	CEG-200	Pneumatic	X	X	X	200	16.8	6.4
	CEL-300	Pump	X	X	X	100	9.1	9.5
	CEL-300SO	Pump	X	X	X	100	9.1	9.5
	CEG-200SO	Pneumatic	X	X	X	200	16.8	6.4
	DEL-400S	Pump	X	X	X	100	9.1	9.5
QCEC	CVE-D	Vacuum	X	X	X		6.7	6.4
1916 Dean, Box 6010	CVE-77	Vacuum	X	X	X		6.7	6.4
Des Moines, Iowa 50309	CVE-81	Vacuum	X	X	X		6.7	6.4
	Century 2000	Vacuum	X	X	X		6.7	6.4
	E	Dipper	X	X	X			
	LF	Plunger	X	X	X			
Sirco	B/VS Series	Vacuum	X	X	X	High	5.5-6.7	10
8815 Selkirk St.	B/VS Series	Vacuum	X	X	X	High	5.5-6.7	10
Vancouver, B.C. V6P 457	B/IE-VS	Cup		X	X			50
Sonford	NW-3	Evacuated		X	X		0.9	6.4
905 N. Fifth Ave.	TC-2	Dipper		X	X			

*VCTV = Volume Constant Time Variable
VCTC = Volume Constant Time Constant
VVTV = Volume Variable Time Constant

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SAMPLE TYPES

The selection of the type of sample to be collected depends on a number of factors, such as the rates of change of flow and the character of the water or wastewater, the accuracy required, and the availability of funds for conducting the sampling program. There is presently a tendency on the part of some workers to make only two distinctions in sample types - grab and composite. This is unfortunate, since a composite sample may be made up in a number of ways, and results may or may not be comparable, depending upon variations in flow and constituents. It is a better practice to distinguish among the various methods of compositing by referring to them as sample types. There are six major types of samples and they are listed below:

Discrete Samples (Individual and Sequential)

An individual discrete sample (sometimes called a grab sample) is one that is collected over a period of time not to exceed 15 minutes and retained separately for analysis. A sequential discrete sample is a series of such samples, usually taken at constant time intervals (e.g., one each hour over a 24-hour period), but sometimes fixed volumes in separate containers at constant discharge increments (e.g., one for each 100,000 gallons of flow) when paced by a flow totalizer.

Composite Sample - NPDES Requirements

A simple composite sample is one that is made up of a series of aliquots (smaller samples) of constant volume collected at regular time intervals and combined in a single container. A composite sample should contain a minimum of eight discrete samples taken at equal time intervals over the compositing period or proportional to flow rate over the compositing period. More than the minimum number of discrete samples will be required where the wastewater loading is highly variable. Individual aliquots of a composite sample should be at least 100 milliliters in order to minimize sampler solid's bias.

Flow Proportional Composite Sample

A flow proportional composite sample is one collected in a single container in which the volume collected is related to the flow volume during the period of compositing, thus, indicating the "average" condition during the period. One of the two ways of accomplishing this is to collect aliquots of equal volume (Vc), but at variable time intervals (Tv), that are inversely proportional to the volume of the flow. That is, the time interval between aliquots is reduced as the volume of flow increases. Alternatively, flow proportioning can be achieved by increasing the volume of each aliquot in proportion to the flow (Vv), but keeping the time interval between aliquots constant (Tc).

Hand Proportioned Composite

The hand proportioned composite can be obtained where flow charts are available. Individual or sequential composite samples (defined below) are manually composited in accordance with the flow to obtain this useful and representative type of sample.

Sequential Composite Sample

The sequential composite requires the collection of a series (usually 2 to 8) of individual samples per container, each container representing a specific time period. For example, in order to monitor for potential intermittent spills of about 15 minutes duration once every 24 hours, 8 aliquots may be collected each hour and composited into one sample for a total collection of 24 such samples. Such a procedure is particularly useful where the character of the waste may vary significantly in a short period of time, where batch dumping is expected, or where self-cancelling conditions occur, such as alternating high and low pH, which would not be apparent in a simple composite sample.

Continuous Composite Sample

A continuous composite sample is one collected by extracting a small, continuously flowing stream from the bulk source and directing it into the sample container. The sample flow rate may be constant (Qc), in which case the sample is analogous to the simple composite, or it may be varied in proportion to the bulk source flow rate (Qv), in which case the sample is analogous to the flow proportional composite.

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