



Method Equivalence for EPA Compliance Monitoring

Thermo Fisher Scientific, Orion Water Analysis Instruments, Electrochemistry and Colorimetry Products

166 Cummings Center, Beverly, MA 01915 USA, 1-800-225-1480, www.thermo.com/water

Analyte	Matrix	Analytical Method	Orion Method	Format	Range - submitted method	MDL/LL	EPA Approved Reference Method*
Acidity	WW	Electrometric Endpoint	pH titration	electrode	NA		SM 2310B(4a), ASTM D1067-92,02
Alkalinity	DW	Electrometric	pH titration	electrode	NA		SM 2320B, ASTM D1067-92,02B
Alkalinity	WW	Electrometric Titration	pH titration	electrode	NA		SM 2320B, ASTM D1067-92,02
Ammonia	WW	Electrode	Ammonia ISE	electrode	0.03 - 1400 mg/L	0.01 mg/L	SM 4500-NH ₃ F or G (18th), SM 4500-NH ₃ D or E (19th, 20th), ASTM D1426-98,03 (B).
Ammonia	WW	Nesslerization, Colorimetry	AC4012	ampoule	0.045 - 7.0 mg/L	0.045 mg/L	SM 4500-NH ₃ C (18th ed)
Biochemical Oxygen Demand (BOD ₅)	WW	Dissolved Oxygen Depletion	Dissolved Oxygen ISE	electrode	NA		SM 5210B
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	WW	Dissolved Oxygen Depletion w/ nitrification inhibitor	Dissolved Oxygen ISE	electrode	NA		SM 5210B
Chemical Oxygen Demand (COD), 0-1500 ppm	WW	Closed reflux, Colorimetry (Spectrophotometric)	CODH00	vials	100-1500 mg/L	16 mg/L	SM 5220D
Chemical Oxygen Demand (COD), 0-150 ppm	WW	Closed reflux, Colorimetry (Spectrophotometric)	CODL00	vials	15-150 mg/L	4.6 mg/L	SM 5220D
Chloride	WW	Potentiometric Titration	Silver nitrate titration	electrode	≥0.5 mg/L		SM 4500-Cl ⁻ D
Chloride	WW	Ion Selective Electrode	Chloride ISE	electrode	2-1000 mg/L		ASTM D512-89(99) (C)
Chloride	DW	Ferricyanide, Colorimetry	AC4017	ampoule	3.0 - 40 mg/L	1.0 mg/L	SM 4500-Cl ⁻ E
Chloride	WW	Ferricyanide, Colorimetry	AC4017	ampoule	3.0 - 40 mg/L	1.0 mg/L	SM 4500-Cl ⁻ E
Chlorine, Total	DW	Iodometric Electrode	Orion 9770 IM	electrode	0.01 - 20 mg/L		SM 4500 Cl I
Chlorine, Total	WW	Electrode	Orion 9770 IM	electrode	0.01 - 20 mg/L		Orion Instruction Manual Model 9770.
Chlorine (free and total)	DW	DPD, Colorimetry	AC4070	ampoule	0.15 - 5.0 mg/L	0.05 mg/L	SM 4500-Cl G
Chlorine, Total	WW	DPD, Colorimetry	AC4070	ampoule	0.15 - 5.0 mg/L	0.05 mg/L	SM 4500-Cl G
Chlorine Free	DW	DPD, Colorimetry	AC4P71	powder	0.1-2.0 mg/L	0.03 mg/L	SM 4500-Cl G
Chlorine, Total	DW	DPD, Colorimetry	AC4P72	powder	0.1-2.0 mg/L	0.03 mg/L	SM 4500-Cl G
Chlorine, Total	WW	DPD, Colorimetry	AC4P72	powder	0.1-2.0 mg/L	0.03 mg/L	SM 4500-Cl G
Chlorine, Total	DW	DPD, Colorimetry	AC2072	tablet	0.1-4.0 mg/L	0.03 mg/L	SM 4500-Cl G
Chlorine, Total	WW	DPD, Colorimetry	AC2072	tablet	0.1-4.0 mg/L	0.03 mg/L	SM 4500-Cl G
Conductivity	DW	Conductance	Conductivity Electrode	electrode	0.055 - 300 uS; 1 uS - 200 mS		SM 2510B, ASTM D1125-95 (99) A
Conductivity	WW	Wheatstone bridge	Conductivity Electrode	electrode	0.055 - 300 uS; 1 uS - 200 mS		EPA 120.1 (rev 1982), SM 2510B, ASTM D1125-95(99)(A)
Copper	WW	Bicinchoninate, Colorimetry	AC4P29	powder	0.02 - 5.0 mg/L	0.02 mg/L	Method 8506 (Hach)
Copper (soluble)	WW	Bathocuproine, Colorimetry	AC4029	ampoule	0.03 - 12 mg/L	0.03 mg/L	SM 3500 Cu C
Cyanide	DW	Selective Electrode	Cyanide ISE	electrode	0.05 - 10 mg/L	0.025 mg/L	SM 4500 CN ⁻ F
Cyanide	WW	Ion Selective Electrode	Cyanide ISE	electrode	0.05 - 10 mg/L	0.025 mg/L	SM 4500-CN ⁻ F, ASTM D2036-98(A)
Fluoride	DW	Manual Electrode	Fluoride ISE	electrode	0.1 - 10 mg/L	0.02 mg/L	SM 4500-F ⁻ C, ASTM D1179-93,99(B)
Fluoride	WW	Electrode	Fluoride ISE	electrode	0.1 - 10 mg/L	0.02 mg/L	SM 4500-F ⁻ C, ASTM D1179-93,99(B)
Fluoride	DW	SPADNS, Colorimetry	AC2009	liquid	0.2-1.4 mg/L	0.08 mg/L	SM 4500-F ⁻ D
Fluoride	WW	SPADNS, Colorimetry	AC2009	liquid	0.2-1.4 mg/L	0.08 mg/L	SM 4500-F ⁻ D
Hydrogen Ion (pH)	DW	Electrometric	pH Electrode	electrode	0 - 14 pH	NA	EPA 150.1 & 150.2, SM 4500-H ⁺ B, ASTM D1293-95,99



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Hydrogen Ion (pH)	WW	Electrometric Measurement	pH Electrode	electrode	0 - 14 pH	NA	EPA 150.2, SM 4500-H+ B, ASTM D1293-84(90), 99 (AorB)
Iron 1 (total & soluble)	WW	Phenanthroline, Colorimetry	AC4078	ampoule	0.03 - 7.0 mg/L	0.03 mg/L	SM 3500-Fe B
Kjeldahl Nitrogen	WW	Electrode	Ammonia ISE	electrode	see ammonia ISE		4500-NH ₃ F or G (18th), 4500-NH ₃ D or E (19th, 20th)
Manganese	WW	Periodate, Colorimetry	AC4055	ampoule	0.20 - 30 mg/L	0.1 mg/L	Method 8034 (Hach)
Nitrate	DW	Ion Selective Electrode	Nitrate ISE	electrode	0.14 - 1400 mg/L	0.1 mg/L	SM 4500 NO ₃ ⁻ D, Orion Technical Bulletin 601
Nitrate	WW	Ion Selective Electrode	Nitrate ISE	electrode	0.14 - 1400 mg/L	0.1 mg/L	SM 4500 NO ₃ ⁻ D
Nitrite	DW	Diazotization, Colorimetry	AC4046	ampoule	0.05 - 0.80 mg/L	0.015 mg/L	SM 4500-NO ₂ B
Nitrite	WW	Diazotization, Colorimetry	AC4046	ampoule	0.05 - 0.80 mg/L	0.015 mg/L	SM 4500-NO ₂ B
Nitrite	WW	Diazotization, Colorimetry	AC2046	tablet	0.05-0.50 mg/L NO ₂ -N	0.009 mg/L	SM 4500-NO ₂ B
Nitrite	DW	Diazotization, Colorimetry	AC2046	tablet	0.05-0.50 mg/L NO ₂ -N	0.009 mg/L	SM 4500-NO ₂ B
Organic Nitrogen	WW	Total Kjeldahl Nitrogen minus Ammonia Nitrogen	Ammonia ISE	electrode	see ammonia ISE		Total Kjeldahl Nitrogen minus Ammonia Nitrogen
Oxygen, Dissolved (DO)	WW	Electrode	Dissolved Oxygen ISE	electrode	NA		SM 4500-O G, ASTM D888-92.03(B)
pH	DW	Electrometric	pH Electrode	electrode	0 - 14 pH	NA	EPA 150.1 & 150.2, SM 4500-H ⁺ B, ASTM D1293-95.99
pH	WW	Electrometric Measurement	pH Electrode	electrode	0 - 14 pH	NA	EPA 150.2, SM 4500-H+ B, ASTM D1293-84(90), 99 (AorB)
Phosphorus	DW	Ascorbic Acid, Colorimetry	AC2095	tablet	0.15-4.0 mg/L as PO ₄	0.05 mg/L	SM 4500-P E
Phosphorus	WW	Ascorbic Acid, Colorimetry	AC2095	tablet	0.15-4.0 mg/L as PO ₄	0.05 mg/L	SM 4500-P E
Specific Conductance	DW	Conductance	Conductivity Electrode	electrode	0.055 - 300 uS; 1 uS - 200 mS		SM 2510B, ASTM D1125-95 (99) A
Specific Conductance	WW	Wheatstone bridge	Conductivity Electrode	electrode	0.055 - 300 uS; 1 uS - 200 mS		EPA 120.1 (rev 1982), SM 2510B, ASTM D1125-95(99)(A)
Sulfate	DW	Turbidimetric, Colorimetry	AC4082	ampoule	5 - 100 mg/L	2.0 mg/L	SM 426C (15th ed.), ASTM D516-02
Sulfate	WW	Turbidimetric, Colorimetry	AC4082	ampoule	5 - 100 mg/L	2.0 mg/L	SM 426C (15th ed.), ASTM D516-02
Sulfate	WW	Turbidimetric, Colorimetry	AC4P82	powder	3.0 - 70 mg/L	1.0 mg/L	ASTM D516-02
Sulfide	WW	Ion Selective Electrode	Sulfide ISE	electrode	0.032 - 100 mg/L	0.03 mg/L	SM 4500-S ²⁻ G, ASTM D4658-03
Sulfide (soluble)	WW	Methylene Blue, Colorimetry	AC4016	ampoule	0.10 - 3.0 mg/L	0.04 mg/L	SM 4500-S ²⁻ D
Zinc	WW	Zincon, Colorimetry	AC4065	ampoule	0.02 - 3.0 mg/L	0.02 mg/L	SM 3500-Zn B (20th)

* - per 40 CFR Part 122, 136, et al., Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; etc., Federal Register, March 12, 2007, Part III, EPA.

SM = Standard Methods for the Examination of Water and Wastewater, published by American Public Health Association, Washington, D.C., 20005. USA. www.standardmethods.org.

All Standard Methods (SM) references apply to 18th, 19th, and 20th editions, unless otherwise noted.

ASTM = Annual Book of Standards, Volumes 11.01 and 11.02, D19 Water, ASTM International, West Conshohocken, PA, 19428. USA. www.astm.org.

MDL/LL = Method Detection Limit per EPA (40 CFR Part 136, Appendix B) or lower limit.

Contact our Technical Service group at 1-800-225-1480 for assistance.