



Thermo Scientific  
Drinking Water & Wastewater Analysis



# EPA methods for water analysis

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## EPA Methods for Drinking Water Analysis

Safe drinking water is essential to our health and strictly regulated all over the world. We offer a variety of water analysis products designed to assist in your testing of drinking water. Thermo Scientific™ Orion™ Versa Star™ and Thermo Scientific™ Orion Star™ A series meters measure dissolved oxygen through luminescence-based optical dissolved oxygen sensors. Thermo Scientific™ Orion™ AQ4500 turbidity meters measure turbidity by nephelometry using the EPA-approved Method 180.1. Orion AQUAfast AQ3700 colorimetry meters measure ammonia as described in Standard Methods 4500-NH<sub>3</sub> F. Thermo Scientific™ AquaPro™ multi-input analyzers paired with Thermo Scientific™ Orion™ pHR Process ROSS™ electrodes measure pH as described in EPA Method 150.2.

Analyte	Analytical Method	Format	Electrode or Reagent	Measurement System for Analysis*	Measurement Range	EPA-Approved Reference Method**
Alkalinity	Electrometric Titration	Electrode	8172BNWP	STARA2115	per method	SM 2320B; ASTM D1067-92,-02,-06 (B)
Chloride	Potentiometric Titration	Electrode	9616BNWP	2115000 + 9616BNWP	≥ 0.5 mg/L	SM 4500-Cl <sup>-</sup> D
Chlorine Dioxide	DPD, Colorimetry	Tablet	AC2099	AQ8000 + AC2099	0.02 - 11 mg/L	SM 4500 ClO <sub>2</sub> D
Chlorine Dioxide	DPD, Colorimetry	Tablet	AC2099	AQ3700 + AC2099	0.02 - 11 mg/L	SM 4500 ClO <sub>2</sub> D
Chlorine Dioxide	DPD, Colorimetry	Ampoule	AC4099	AQ4000 + AC4099	0.8 - 11 mg/L	SM 4500 ClO <sub>2</sub> D
Chlorine, Free & Total, Combined	DPD, Colorimetry	Tablet	AC2070	AQ8000 + AC2070	0.01 - 6.0 mg/L	SM 4500-Cl G
Chlorine, Free & Total, Combined	DPD, Colorimetry	Tablet	AC2070	AQ3700 + AC2070	0.01 - 6.0 mg/L	SM 4500-Cl G
Chlorine, Free & Total, Combined	DPD, Colorimetry	Ampoule	AC4070	AQ4000 + AC4070	0.4 - 5.0 mg/L	SM 4500-Cl G; ATP Orion Method AC4070
Chlorine, Free	DPD, Colorimetry	Tablet	AC2071	AQ8000 + AC2071	0.01 - 6.0 mg/L	SM 4500-Cl G
Chlorine, Free	DPD, Colorimetry	Tablet	AC2071	AQ3700 + AC2071	0.01 - 6.0 mg/L	SM 4500-Cl G
Chlorine, Free	DPD, Colorimetry	Powder	AC4P71	AQ8000 + AC4P71	0.02 - 2.0 mg/L	SM 4500-Cl G; ATP Orion Method AC4P71
Chlorine, Free	DPD, Colorimetry	Powder	AC4P71	AQ3700 + AC4P71	0.02 - 2.0 mg/L	SM 4500-Cl G; ATP Orion Method AC4P71
Chlorine, Free	DPD Colorimetry	In-line (process) Analyzer	Chlorine XP	CXP71	0.01 - 10 mg/L	EPA 334.0
Chlorine, Total	DPD, Colorimetry	Tablet	AC2072	AQ8000 + AC2072	0.01 - 6.0 mg/L	SM 4500-Cl G; ATP Orion Method AC2072
Chlorine, Total	DPD, Colorimetry	Tablet	AC2072	AQ3700 + AC2072	0.01 - 6.0 mg/L	SM 4500-Cl G; ATP Orion Method AC2072
Chlorine, Total	DPD, Colorimetry	Powder	AC4P72	AQ8000 + AC4P72	0.02 - 2.0 mg/L	SM 4500-Cl G; ATP Orion Method AC4P72
Chlorine, Total	DPD, Colorimetry	Powder	AC4P72	AQ3700 + AC4P72	0.02 - 2.0 mg/L	SM 4500-Cl G; ATP Orion Method AC4P72
Chlorine, Total	Iodometric Electrode	Electrode	9770BNWP	STARA2140 + 9770BNWP	0.01 - 20 mg/L	SM 4500-Cl I
Color	Platinum Cobalt	Spectrophotometer	AQ8000	AQ8000	≤ 500 CU	SM 2120B
Conductivity	Conductance	Electrode	013005MD	STARA2125	1 µS - 200 mS	SM 2510B; D1125-95, -99 (A)
Conductivity	Conductance	Electrode	013016MD	STARA2126	0.01 - 300 µS	SM 2510B; D1125-95, -99 (A)
Cyanide	Pyridine-Barbituric Acid, Colorimetry	Powder & Liquid	AC4P06	AQ3700 + AC4P06	0.01 - 0.5 mg/L	SM 4500-CN <sup>-</sup> E, ASTM D2036-06 (A)
Cyanide	Isonicotinic-Barbituric Acid, Colorimetry <sup>1</sup>	Ampoule	AC4006	AQ4000 + AC4006	0.01 - 0.4 mg/L	ETV Verified; SM 4500-CN <sup>-</sup> E, ASTM D2036-06 (A)
Cyanide	Ion Selective Electrode	Electrode	9606BNWP	STARA2140 + 9606BNWP	0.2 - 260 mg/L	SM 4500-CN <sup>-</sup> F
Fluoride	SPADNS, Colorimetry	Liquid	AC2009	AQ8000 + AC2009	0.05 - 2.0 mg/L	SM 4500-F <sup>-</sup> D; ATP Orion Method AC2009
Fluoride	SPADNS, Colorimetry	Liquid	AC2009	AQ3700 + AC2009	0.05 - 2.0 mg/L	SM 4500-F <sup>-</sup> D; ATP Orion Method AC2009
Fluoride	Ion Selective Electrode	Electrode	9609BNWP	STARA2147	0.02 mg/L to saturated	SM 4500-F <sup>-</sup> C, ASTM D1179-04, -10 (B)
Hydrogen Ion (pH)	Electrometric	Electrode	8172BNWP	STARA2115	0 - 14 pH	EPA 150.1; SM 4500-H <sup>+</sup> B; ASTM D1293-99
Hydrogen Ion (pH)	Electrometric	Electrode, Automated	SH36A9210	AP1XXXK + SH36A9210	0 - 14 pH	EPA 150.2; ASTM D1293-99 (B)
Nitrate	Cadmium Reduction <sup>2</sup>	Ampoule	AC4004	AQ4000 + AC4004	0.2 - 1.5 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E; ASTM D3867-90 (B)
Nitrate	Cadmium Reduction <sup>2</sup>	Ampoule	AC4005	AQ4000 + AC4005	0.4 - 3.0 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E; ASTM D3867-90 (B)
Nitrate	Cadmium Reduction <sup>2</sup>	Ampoule	AC4007	AQ4000 + AC4007	5.0 - 50 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E; ASTM D3867-90 (B)
Nitrate	Zinc Reduction <sup>3,4</sup>	Tablet	AC2007	AQ8000 + AC2007	1.0 - 40 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E, ASTM D3867-04 (B)
Nitrate	Zinc Reduction <sup>3</sup>	Tablet	AC2007	AQ4000 + AC2007	1.0 - 40 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E; ASTM D3867-90 (B)
Nitrate	Zinc Reduction <sup>3,4</sup>	Tablet	AC2007	AQ3700 + AC2007	1.0 - 40 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E; ASTM D3867-90 (B)
Nitrate	Ion Selective Electrode	Electrode	9707BNWP	2115204	0.1 - 14000 mg/L	SM 4500-NO <sub>3</sub> <sup>-</sup> D; Orion Method 601
Nitrite	Diazotization, Colorimetry	Tablet	AC2046	AQ8000 + AC2046	0.01 - 0.5 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B; ATP Orion Method AC2046
Nitrite	Diazotization, Colorimetry	Tablet	AC2046	AQ3700 + AC2046	0.01 - 0.5 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B; ATP Orion Method AC2046

Analyte	Analytical Method	Format	Electrode or Reagent	Measurement System for Analysis*	Measurement Range	EPA-Approved Reference Method**
Nitrite	Diazotization, Colorimetry	Powder	AC4P46	AQ8000 + AC4P46	0.01 - 0.3 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B; ASTM D3867-90 (B)
Nitrite	Diazotization, Colorimetry	Powder	AC4P46	AQ3700 + AC4P46	0.01 - 0.3 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B; ASTM D3867-90 (B)
Nitrite	Diazotization, Colorimetry	Ampoule	AC4046	AQ4000 + AC4046	0.08 - 0.8 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B; ASTM D3867-90 (B)
Ortho-phosphate	Ascorbic Acid, Colorimetry	Tablet	AC2095-WA	AQ8000 + AC2095-WA	0.05 - 4.0 mg/L PO <sub>4</sub> <sup>-</sup>	SM 4500-P E; ATP Orion Method AC2095
Ortho-phosphate	Ascorbic Acid, Colorimetry	Tablet	AC2095-WA	AQ3700 + AC2095-WA	0.05 - 4.0 mg/L PO <sub>4</sub> <sup>-</sup>	SM 4500-P E; ATP Orion Method AC2095
Ortho-phosphate	Ascorbic Acid, Colorimetry	Powder	AC4P95	AQ8000 + AC4P95	0.06 - 2.5 mg/L PO <sub>4</sub> <sup>-</sup>	SM 4500-P E; ASTM D515-88 (A)
Ortho-phosphate	Ascorbic Acid, Colorimetry	Powder	AC4P95	AQ3700 + AC4P95	0.06 - 2.5 mg/L PO <sub>4</sub> <sup>-</sup>	SM 4500-P E; ASTM D515-88 (A)
Ortho-phosphate	Ascorbic Acid, Colorimetry	Tube Test	ACR095	AQ8000 + ACR095	0.06 - 5.0 mg/L PO <sub>4</sub> <sup>-</sup>	SM 4500-P E; ASTM D515-88 (A)
Ortho-phosphate	Ascorbic Acid, Colorimetry	Tube Test	ACR095	AQ3700 + ACR095	0.06 - 5.0 mg/L PO <sub>4</sub> <sup>-</sup>	SM 4500-P E; ASTM D515-88 (A)
pH	Electrometric	Electrode	8172BNWP	STARA2115	0 - 14 pH	EPA 150.1; SM 4500-H <sup>+</sup> B; ASTM D1293-99
Silica	Heteropoly Blue, Colorimetry	Tablet	AC2060 + AC2061	AQ8000 + AC2060 + AC2061	0.05 - 4.0 mg/L	SM 4500-SiO <sub>2</sub> D; ASTM D859-05, -10
Silica	Heteropoly Blue, Colorimetry	Tablet	AC2060 + AC2061	AQ3700 + AC2060 + AC2061	0.05 - 4.0 mg/L	SM 4500-SiO <sub>2</sub> D; ASTM D859-05, -10
Silica	Heteropoly Blue, Colorimetry	Ampoule	AC4060	AQ4000 + AC4060	0.05 - 10 mg/L	SM 4500-SiO <sub>2</sub> D; ASTM D859-05, -10
Silica	Molybdosilicate, Colorimetry	Powder	AC4P60	AQ8000 + AC4P60	1.0 - 90 mg/L	SM 4500-SiO <sub>2</sub> C
Silica	Molybdosilicate, Colorimetry	Powder	AC4P60	AQ3700 + AC4P60	1.0 - 90 mg/L	SM 4500-SiO <sub>2</sub> C
Specific Conductance	Conductance	Electrode	013005MD	STARA2125	1 uS - 200 mS	SM 2510B; D1125-95, -99 (A)
Specific Conductance	Conductance	Electrode	013016MD	STARA2126	0.01 - 300 uS	SM 2510B; D1125-95, -99 (A)
Sulfate	Turbidimetric, Colorimetry	Tablet	AC2082	AQ3700 + AC2082	5.0 - 100 mg/L	ASTM D516-07; SM 4500-SO <sub>4</sub> <sup>2-</sup> E
Sulfate	Turbidimetric, Colorimetry	Powder	AC4P82	AQ8000 + AC4P82	5.0 - 100 mg/L	ASTM D516-07; SM 4500-SO <sub>4</sub> <sup>2-</sup> E
Sulfate	Turbidimetric, Colorimetry	Powder	AC4P82	AQ3700 + AC4P82	5.0 - 100 mg/L	ASTM D516-07; SM 4500-SO <sub>4</sub> <sup>2-</sup> E
Sulfate	Turbidimetric, Colorimetry	Ampoule	AC4082	AQ4000 + AC4082	8.0 - 100 mg/L	ASTM D516-07; SM 4500-SO <sub>4</sub> <sup>2-</sup> E
Turbidity	Nephelometric, LED	Turbidity Meter	AQ4500	AQ4500	0.02 - 1000 NTU	ATP Method Orion AQ4500 (LED Nephelometry)
UV 254	for SUVA	Spectrophotometer	AQ8000	AQ8000	per method	EPA 415.3, Rev 1.1; SM 5910B

## EPA Methods for Wastewater Analysis

Environmental safety begins with reliable measurements. We offer a variety of water analysis products designed to help meet your testing needs for wastewater analysis. The latest EPA Methods Update Rule (MUR) included approval of new and revised methods for wastewater testing under the Clean Water Act, including dissolved oxygen, turbidity, and ammonia methods. Orion Versa Star and Orion Star A series meters can measure dissolved oxygen through luminescence-based optical dissolved oxygen sensors. Orion AQUAfast AQ4500 turbidity meters measure turbidity by nephelometry using the EPA-approved Method 180.1. Orion AQUAfast AQ3700 colorimetry meters measure ammonia as described in Standard Methods 4500-NH<sub>3</sub> F.

Analyte	Analytical Method	Format	Electrode or Reagent	Measurement System for Analysis*	Measurement Range	EPA-Approved Reference Method**
Acidity	Electrometric Endpoint	Electrode	8172BNWP	STARA2115	per method	SM 2310 B-1997; ASTM D1067-06
Alkalinity	Electrometric Titration	Electrode	8172BNWP	STARA2115	per method	SM 2320 B-1997; ASTM D1067-06
Aluminum	Eriochrome Cyanine R	Tablet	AC2027	AQ8000 + AC2027	0.01 - 0.3 mg/L	SM 3500-AI B-2001
Aluminum	Eriochrome Cyanine R	Tablet	AC2027	AQ3700 + AC2027	0.01 - 0.3 mg/L	SM 3500-AI B-2001
Aluminum	Eriochrome Cyanine R	Powder & Liquid	AC4P27	AQ8000 + AC4P27	0.01 - 0.25 mg/L	SM 3500-AI B-2001
Aluminum	Eriochrome Cyanine R	Powder & Liquid	AC4P27	AQ3700 + AC4P27	0.01 - 0.25 mg/L	SM 3500-AI B-2001
Aluminum	Eriochrome Cyanine R	Ampoule	AC4027	AQ4000 + AC4027	0.04 - 0.25 mg/L	SM 3500-AI B-2001
Ammonia	Ion Selective Electrode	Electrode	9512HPBNWP or 9512BNWP	STARA2146	0.01 - 17000 mg/L	SM 4500-NH <sub>3</sub> D-1997 or E-1997; ASTM D1426-08 (B)
Ammonia	Indophenol Phenate, Colorimetry	Tablet	AC2012	AQ8000 + AC2012	0.02 - 1 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Indophenol Phenate, Colorimetry	Tablet	AC2012	AQ3700 + AC2012	0.02 - 1 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Salicylate, Colorimetry	Powder	AC4P12	AQ8000 + AC4P12	0.01 - 0.8 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Salicylate, Colorimetry	Powder	AC4P12	AQ3700 + AC4P12	0.01 - 0.8 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Salicylate, Colorimetry	Tube Test	ACR012	AQ8000 + ACR012	0.02 - 2.5 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Salicylate, Colorimetry	Tube Test	ACR012	AQ3700 + ACR012	0.02 - 2.5 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Salicylate, Colorimetry	Tube Test	ACR011	AQ8000 + ACR011	1.0 - 50 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Salicylate, Colorimetry	Tube Test	ACR011	AQ3700 + ACR011	1.0 - 50 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Salicylate, Colorimetry	Ampoule	AC4010	AQ4000 + AC4010	0.2 - 3; 2 - 30 mg/L	SM 4500-NH <sub>3</sub> F-1997
Ammonia	Nesslerization, Colorimetry	Ampoule	AC4012	AQ4000 + AC4012	0.5 - 7 mg/L	ASTM D1426-08 (A)
Ammonia	Nesslerization, Colorimetry	Ampoule	AC4011	AQ4000 + AC4011	1.0 - 14 mg/L	ASTM D1426-08 (A)
Biochemical Oxygen Demand (BOD <sub>5</sub> )	Dissolved Oxygen Depletion	Electrode	086030MD	STARA2136	Per Method	SM 5210 B-2001
Biochemical Oxygen Demand (BOD <sub>5</sub> )	Dissolved Oxygen Depletion	Electrode	087010MD - RDO (Optical)	STARA2130 + 087010MD	Per Method	ATP Method 1003-8-2009
Bromide	Ion Selective Electrode	Electrode	9635BNWP	STARA2140 + 9635BNWP	0.4 - 79900 mg/L	ASTM D1246-05
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	Dissolved Oxygen Depletion w/ Nitrification Inhibitor	Electrode	086030MD	STARA2136	Per Method	SM 5210 B-2001
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	Dissolved Oxygen Depletion w/Nitrification Inhibitor	Electrode	087010MD - RDO (Optical)	STARA2130 + 087010MD	Per Method	ATP Method 1004-8-2009
Chemical Oxygen Demand (COD) 0-150 ppm	Closed reflux, Colorimetry (Spectrophotometric)	Vials	CODL00	AQ8000 + CODL00 + COD165	0 - 150 mg/L	SM 5220 D-1997; ASTM D1252-06 (B); ATP Orion Method CODL00
Chemical Oxygen Demand (COD) 0-150 ppm	Closed Reflux, Colorimetry (Spectrophotometric)	Vials	CODL00	AQ3700 + CODL00 + COD165	0 - 150 mg/L	SM 5220 D-1997; ASTM D1252-06 (B); ATP Orion Method CODL00
Chemical Oxygen Demand (COD) 0-1500 ppm	Closed reflux, Colorimetry (Spectrophotometric)	Vials	CODH00	AQ8000 + CODH00 + COD165	20 - 1500 mg/L	SM 5220 D-1997; ASTM D1252-06 (B); ATP Orion Method CODH00
Chemical Oxygen Demand (COD) 0-1500 ppm	Closed reflux, Colorimetry (Spectrophotometric)	Vials	CODH00	AQ3700 + CODH00 + COD165	20 - 1500 mg/L	SM 5220 D-1997; ASTM D1252-06 (B); ATP Orion Method CODH00
Chloride	Ferricyanide, Colorimetry	Ampoule	AC4017	AQ4000 + AC4017	2.5 - 40 mg/L	SM 4500-Cl <sup>-</sup> E-1997
Chloride	Potentiometric Titration	Electrode	9616BNWP	2115000 + 9616BNWP	≥ 0.5 mg/L	SM 4500-Cl <sup>-</sup> D-1997
Chloride	Ion Selective Electrode	Electrode	9617BNWP	2115202	1.8 - 35500 mg/L	ASTM D512-04 (C)
Chlorine, Free & Total	DPD, Colorimetry	Tablet	AC2070	AQ8000 + AC2070	0.01 - 6.0 mg/L	SM 4500-Cl G-2000

Analyte	Analytical Method	Format	Electrode or Reagent	Measurement System for Analysis*	Measurement Range	EPA-Approved Reference Method**
Chlorine, Free & Total	DPD, Colorimetry	Tablet	AC2070	AQ3700 + AC2070	0.01 - 6.0 mg/L	SM 4500-Cl G-2000
Chlorine, Free & Total	DPD, Colorimetry	Ampoule	AC4070	AQ4000 + AC4070	0.4 - 5.0 mg/L	SM 4500-Cl G-2000; ATP Orion Method AC4070 (total)
Chlorine, Free	DPD, Colorimetry	Tablet	AC2071	AQ8000 + AC2071	0.01 - 6.0 mg/L	SM 4500-Cl G-2000
Chlorine, Free	DPD, Colorimetry	Tablet	AC2071	AQ3700 + AC2071	0.01 - 6.0 mg/L	SM 4500-Cl G-2000
Chlorine, Free	DPD, Colorimetry	Powder	AC4P71	AQ8000 + AC4P71	0.02 - 2.0 mg/L	SM 4500-Cl G-2000
Chlorine, Free	DPD, Colorimetry	Powder	AC4P71	AQ3700 + AC4P71	0.02 - 2.0 mg/L	SM 4500-Cl G-2000
Chlorine, Total	DPD, Colorimetry	Tablet	AC2072	AQ8000 + AC2072	0.01 - 6.0 mg/L	SM 4500-Cl G-2000; ATP Orion Method AC2072
Chlorine, Total	DPD, Colorimetry	Tablet	AC2072	AQ3700 + AC2072	0.01 - 6.0 mg/L	SM 4500-Cl G-2000; ATP Orion Method AC2072
Chlorine, Total	DPD, Colorimetry	Powder	AC4P72	AQ8000 + AC4P72	0.02 - 2.0 mg/L	SM 4500-Cl G-2000; ATP Orion Method AC4P72
Chlorine, Total	DPD, Colorimetry	Powder	AC4P72	AQ3700 + AC4P72	0.02 - 2.0 mg/L	SM 4500-Cl G-2000; ATP Orion Method AC4P72
Chlorine, Total	DPD, Colorimetry	Ampoule	AC4070	AQ4000 + AC4070	0.4 - 5.0 mg/L	SM 4500-Cl G-2000; ATP Orion Method AC4070
Chlorine, Total	Ion Selective Electrode	Electrode	9770BNWP	STARA2140 + 9770BNWP	0.01 - 20 mg/L	Orion Instruction Manual Model 9770
Color	Platinum Cobalt	Spectrophotometer	AQ8000	AQ8000	≤ 500 CU	SM 2120B
Conductivity	Wheatstone Bridge	Electrode	013005MD	STARA2125	1 μS - 200 mS	EPA 120.1 (rev 1982), SM 2510 B, ASTM D1125-95 (99) (A)
Copper	Bicinchoninate, Colorimetry	Powder	AC4P29	AQ8000 + AC4P29	0.05 - 5.0 mg/L	Method 8506
Copper	Bicinchoninate, Colorimetry	Powder	AC4P29	AQ3700 + AC4P29	0.05 - 5.0 mg/L	Method 8506
Copper (Soluble)	Bathocuproine, Colorimetry	Ampoule	AC4029	AQ4000 + AC4029	0.05 - 12 mg/L	SM 3500-Cu C-1999
Cyanide	Pyridine-barbituric Acid, Colorimetry	Powder & Liquid	AC4P06	AQ3700 + AC4P06	0.01 - 0.5 mg/L	SM 4500-CN <sup>-</sup> E-1999, ASTM D2036-09 (A)
Cyanide	Pyridine-barbituric Acid, Colorimetry	Ampoule	AC4006	AQ4000 + AC4006	0.04 - 0.4 mg/L	SM 4500-CN <sup>-</sup> E-1999, ASTM D2036-09 (A)
Cyanide	Ion Selective Electrode	Electrode	9606BNWP	STARA2140 + 9606BNWP	0.2 - 260 mg/L	SM 4500-CN <sup>-</sup> F-1999, ASTM D2036-09 (A)
Fluoride	SPADNS, Colorimetry	Liquid	AC2009	AQ8000 + AC2009	0.05 - 2.0 mg/L	SM 4500-F <sup>-</sup> D-1997; ATP Orion Method AC2009
Fluoride	SPADNS, Colorimetry	Liquid	AC2009	AQ3700 + AC2009	0.05 - 2.0 mg/L	SM 4500-F <sup>-</sup> D-1997; ATP Orion Method AC2009
Fluoride	Ion Selective Electrode	Electrode	9609BNWP	STARA2147	0.02 mg/L to saturated	SM 4500-F <sup>-</sup> C-1997, ASTM D1179-04 (B)
Hydrogen Ion (pH)	Electrometric Measurement	Electrode	8172BNWP	STARA2115	0 - 14 pH	SM 4500-H <sup>+</sup> B, ASTM D1293-99 (A or B)
Hydrogen Ion (pH)	Electrometric Measurement	Electrode, Automated	Industrial ROSS pH	AP1XXXK + SH36A9210	0 - 14 pH	EPA 150.2 (Dec 1982); ASTM D1293-99 (B)
Iron 1, Total & Soluble	Phenanthroline, Colorimetry	Powder	AC4P78	AQ8000 + AC4P78	0.02 - 3.0 mg/L	SM 3500-Fe-1997
Iron 1, Total & Soluble	Phenanthroline, Colorimetry	Powder	AC4P78	AQ3700 + AC4P78	0.02 - 3.0 mg/L	SM 3500-Fe-1997
Iron 1, Total & Soluble	Phenanthroline, Colorimetry	Ampoule	AC4078	AQ4000 + AC4078	0.02 - 6.0 mg/L	SM 3500-Fe-1997
Kjeldahl Nitrogen	Salicylate, Colorimetry	Powder	AC4P12	AQ8000 + AC4P12	0.01 - 0.8 mg/L NH <sub>3</sub> -N	SM 4500-NH <sub>3</sub> F-1997
Kjeldahl Nitrogen	Salicylate, Colorimetry	Powder	AC4P12	AQ3700 + AC4P12	0.01 - 0.8 mg/L NH <sub>3</sub> -N	SM 4500-NH <sub>3</sub> F-1997
Kjeldahl Nitrogen	Salicylate, Colorimetry	Tube Test	ACR012	AQ8000 + ACR012	0.02 - 2.5 mg/L NH <sub>3</sub> -N	SM 4500-NH <sub>3</sub> F-1997
Kjeldahl Nitrogen	Salicylate, Colorimetry	Tube Test	ACR012	AQ3700 + ACR012	0.02 - 2.5 mg/L NH <sub>3</sub> -N	SM 4500-NH <sub>3</sub> F-1997
Kjeldahl Nitrogen	Salicylate, Colorimetry	Tube Test	ACR011	AQ8000 + ACR011	1.0 - 50 mg/L NH <sub>3</sub> -N	SM 4500-NH <sub>3</sub> F-1997
Kjeldahl Nitrogen	Salicylate, Colorimetry	Tube Test	ACR011	AQ3700 + ACR011	1.0 - 50 mg/L NH <sub>3</sub> -N	SM 4500-NH <sub>3</sub> F-1997
Kjeldahl Nitrogen	Ion Selective Electrode	Electrode	9512HPBNWP or 9512BNWP	STARA2146	0.01 - 17000 mg/L	SM 4500-NH <sub>3</sub> D-1997 or E-1997; ASTM D1426-08 (B)
Manganese	Periodate, Colorimetry	Powder	AC4P55	AQ8000 + AC4P55	0.1 - 18 mg/L	Method 8034

Analyte	Analytical Method	Format	Electrode or Reagent	Measurement System for Analysis*	Measurement Range	EPA-Approved Reference Method**
Manganese	Periodate, Colorimetry	Powder	AC4P55	AQ3700 + AC4P55	0.1 - 18 mg/L	Method 8034
Manganese	Periodate, Colorimetry	Ampoule	AC4055	AQ4000 + AC4055	2.0 - 30 mg/L	Method 8034
Nitrate	Cadmium Reduction <sup>2</sup>	Ampoule	AC4004	AQ4000 + AC4004	0.2 - 1.5 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E, ASTM D3867-04 (B)
Nitrate	Cadmium Reduction <sup>2</sup>	Ampoule	AC4005	AQ4000 + AC4005	0.4 - 3.0 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E, ASTM D3867-04 (B)
Nitrate	Cadmium Reduction <sup>2</sup>	Ampoule	AC4007	AQ4000 + AC4007	5.0 - 50 mg/L NO <sub>3</sub> <sup>-</sup>	SM 4500-NO <sub>3</sub> <sup>-</sup> E, ASTM D3867-04 (B)
Nitrate	Zinc Reduction <sup>3,4</sup>	Tablet	AC2007	AQ8000 + AC2007	1.0 - 40 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E, ASTM D3867-04 (B)
Nitrate	Zinc Reduction <sup>3</sup>	Tablet	AC2007	AQ4000 + AC2007	1.0 - 40 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E, ASTM D3867-04 (B)
Nitrate	Zinc Reduction <sup>3,4</sup>	Tablet	AC2007	AQ3700 + AC2007	1.0 - 40 mg/L NO <sub>3</sub> <sup>-</sup> N	SM 4500-NO <sub>3</sub> <sup>-</sup> E, ASTM D3867-04 (B)
Nitrate	Ion Selective Electrode	Electrode	9707BNWP	2115204	0.10 - 14000 mg/L	SM 4500-NO <sub>3</sub> <sup>-</sup> D
Nitrite	Diazotization, Colorimetry	Tablet	AC2046	AQ8000 + AC2046	0.01 - 0.5 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B; ATP Orion Method AC2046
Nitrite	Diazotization, Colorimetry	Tablet	AC2046	AQ3700 + AC2046	0.01 - 0.5 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B; ATP Orion Method AC2046
Nitrite	Diazotization, Colorimetry	Powder	AC4P46	AQ8000 + AC4P46	0.01 - 0.3 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B
Nitrite	Diazotization, Colorimetry	Powder	AC4P46	AQ3700 + AC4P46	0.01 - 0.3 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B
Nitrite	Diazotization, Colorimetry	Ampoule	AC4046	AQ4000 + AC4046	0.08 - 0.8 mg/L NO <sub>2</sub> <sup>-</sup> N	SM 4500-NO <sub>2</sub> <sup>-</sup> B
Nitrogen, Organic	Total Kjeldahl Nitrogen Minus Ammonia Nitrogen	Electrode	9512HPBNWP or 9512BNWP	STARA2146	0.01 - 17000 mg/L	Total Kjeldahl Nitrogen Minus Ammonia Nitrogen
Nitrogen, Total	Thermal Digestion w/ Persulfate, Colorimetry	Tube Test	ACD004	AQ8000 + ACD004 + COD165	0.5 - 25 mg/L	Approved Total Nitrogen Method Not Promulgated for WW
Nitrogen, Total	Thermal Digestion w/ Persulfate, Colorimetry	Tube Test	ACD004	AQ3700 + ACD004 + COD165	0.5 - 25 mg/L	Approved Total Nitrogen Method Not Promulgated for WW
Nitrogen, Total	Thermal Digestion w/ Persulfate, Colorimetry	Tube Test	ACD007	AQ8000 + ACD007 + COD165	5.0 - 150 mg/L	Approved Total Nitrogen Method Not Promulgated for WW
Nitrogen, Total	Thermal Digestion w/ Persulfate, Colorimetry	Tube Test	ACD007	AQ3700 + ACD007 + COD165	5.0 - 150 mg/L	Approved Total Nitrogen Method Not Promulgated for WW
Ortho-phosphate	Ascorbic Acid, Colorimetry	Tablet	AC2095-WA	AQ8000 + AC2095-WA	0.05 - 4.0 mg/L PO <sub>4</sub>	EPA 365.3; ATP Orion Method AC2095
Ortho-phosphate	Ascorbic Acid, Colorimetry	Tablet	AC2095-WA	AQ3700 + AC2095-WA	0.05 - 4.0 mg/L PO <sub>4</sub>	EPA 365.3; ATP Orion Method AC2095
Ortho-phosphate	Ascorbic Acid, Colorimetry	Powder	AC4P95	AQ8000 + AC4P95	0.06 - 2.5 mg/L PO <sub>4</sub>	SM 4500-P E
Ortho-phosphate	Ascorbic Acid, Colorimetry	Powder	AC4P95	AQ3700 + AC4P95	0.06 - 2.5 mg/L PO <sub>4</sub>	SM 4500-P E
Ortho-phosphate	Ascorbic Acid, Colorimetry	Tube Test	ACR095	AQ8000 + ACR095	0.06 - 5.0 mg/L PO <sub>4</sub>	SM 4500-P E
Ortho-phosphate	Ascorbic Acid, Colorimetry	Tube Test	ACR095	AQ3700 + ACR095	0.06 - 5.0 mg/L PO <sub>4</sub>	SM 4500-P E
Oxygen, Dissolved (DO)	Electrode (Polarographic)	Electrode	083010MD	STARA2230 + 083010MD	0 - >100%	SM 4500-O G, ASTM D888-09 (B)
Oxygen, Dissolved (DO)	Luminescence-based Sensor (Optical)	Electrode	087010MD	STARA2235	0 - >100%	ASTM D888-09(C); ATP Method 1002-8-2009 In-Situ
pH	Electrometric	Electrode	8172BNWP	STARA2115	0 - 14 pH	SM 4500-H <sup>+</sup> B, ASTM D1293-99 (A or B)
pH	Electrometric	Electrode, Automated	Industrial ROSS pH	AquaPro + Industrial ROSS pH	0 - 14 pH	EPA 150.2 (Dec 1982); ASTM D1293-99 (B)
Phosphorous, Total	Persulfate/Thermal Digestion, Ascorbic Acid, Colorimetry	Tube Test	ACD095	AQ8000 + ACD095 + COD165	0.02 - 1.1 mg/L P	SM 4500-P E-1999
Phosphorous, Total	Persulfate/Thermal Digestion, Ascorbic Acid, Colorimetry	Tube Test	ACD095	AQ3700 + ACD095 + COD165	0.02 - 1.1 mg/L P	SM 4500-P E-1999
Silica	Molybdate Reactive, Colorimetry	Tablet	AC2060 + AC2061	AQ8000 + AC2060 + AC2061	0.05 - 4.0 mg/L	ASTM D859-05
Silica	Molybdate Reactive, Colorimetry	Tablet	AC2060 + AC2061	AQ3700 + AC2060 + AC2061	0.05 - 4.0 mg/L	ASTM D859-05
Silica	Molybdosilicate, Colorimetry	Powder	AC4P60	AQ8000 + AC4P60	1.0 - 90 mg/L	SM 4500-SiO <sub>2</sub> C
Silica	Molybdosilicate, Colorimetry	Powder	AC4P60	AQ3700 + AC4P60	1.0 - 90 mg/L	SM 4500-SiO <sub>2</sub> C
Silica	Molybdate Reactive, Colorimetry	Ampoule	AC4060	AQ4000 + AC4060	0.5 - 10 mg/L	ASTM D859-05
Specific Conductance	Wheatstone Bridge	Electrode	013005MD	STARA2125	1 μS - 200 mS	EPA 120.1 (rev 1982), SM 2510B, ASTM D1125-95 (99) (A)
Sulfate	Turbidimetric, Colorimetry	Tablet	AC2082	AQ3700 + AC2082	5.0 - 100 mg/L	ASTM D516-07; SM 4500-SO <sub>4</sub> <sup>2-</sup> E
Sulfate	Turbidimetric, Colorimetry	Powder	AC4P82	AQ8000 + AC4P82	5.0 - 100 mg/L	ASTM D516-07; SM 4500-SO <sub>4</sub> <sup>2-</sup> E
Sulfate	Turbidimetric, Colorimetry	Powder	AC4P82	AC3700 + AC4P82	5.0 - 100 mg/L	ASTM D516-07; SM 4500-SO <sub>4</sub> <sup>2-</sup> E

Analyte	Analytical Method	Format	Electrode or Reagent	Measurement System for Analysis*	Measurement Range	EPA-Approved Reference Method**
Sulfate	Turbidimetric, Colorimetry	Ampoule	AC4082	AQ4000 + AC4082	8.0 - 100 mg/L	ASTM D516-07; SM 4500-SO <sub>4</sub> <sup>2-</sup> E
Sulfide	Methylene Blue, Colorimetry	Ampoule	AC4016	AQ4000 + AC4016	0.2 - 3.0 mg/L	SM 4500-S <sup>2-</sup> D
Sulfide	Ion Selective Electrode	Electrode	9616BNWP	STARA2140 + 9616BNWP	0.003 - 32100 mg/L	SM 4500-S <sup>2-</sup> G, ASTM D4658-08
Turbidity	Nephelometric	Turbidity Meter	AQ4500	AQ4500	0.02 - 1000 NTU	ATP Method Orion AQ4500
Zinc	Zincon, Colorimetry	Tablet	AC2065	AQ8000 + AC2065	0.02 - 1.0 mg/L	SM 3500-Zn B
Zinc	Zincon, Colorimetry	Tablet	AC2065	AQ3700 + AC2065	0.02 - 1.0 mg/L	SM 3500-Zn B
Zinc	Zincon, Colorimetry	Ampoule	AC4065	AQ4000 + AC4065	0.3 - 3.0 mg/L	SM 3500-Zn B

\* Items in the measurement system for analysis column include the meter and reagents or meter and electrode needed for the specified analysis. Visit [thermoscientific.com](http://thermoscientific.com) for a detailed description of our products and their included contents.

\*\* Per 40 CFR Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; etc., Federal Register, May 18, 2012, EPA, Final Rule (wastewater) or per 40 CFR Part 141 - National Primary Drinking Water Regulations, June 28, 2012 (drinking water).

<sup>1</sup> Isonicotinic acid is a non-hazardous alternative to the pyridine reagent. Consult the Method Modifications guidelines in 40 CFR Part 136.6(b)(2)(i) for monitoring use requirements.

<sup>2</sup> Cadmium reduction followed by diazotization. Alternative color reagents are used. Consult the Method Modifications guidelines in 40 CFR Part 136.6(b)(2)(i) for monitoring use requirements.

<sup>3</sup> Zinc reduction followed by diazotization. Alternative color reagents are used. Consult the Method Modifications guidelines in 40 CFR Part 136.6(b)(2)(i) for monitoring use requirements.

<sup>4</sup> User generated curve.

SM = Standard Methods for the Examination of Water and Wastewater, published by American Public Health Association, Washington, D.C., 20005 USA [www.standardmethods.org](http://www.standardmethods.org)

ASTM = Annual Book of Standards, Volumes 11.01 and 11.02, D19 Water, ASTM International, West Conshohocken, PA, 19428 USA [www.astm.org](http://www.astm.org)

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

ATP = Alternative Test Procedure, EPA-approved method



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