

METHODS LIST

Methods List for Automated Ion Analyzers

Flow Injection Analysis • Ion Chromatography

MARCH 2009

QuikChem® Methods List

Use this list to:

- Identify and select analytical methods for your analyte, range, and matrix requirements.
- Locate all current Lachat methods for ion chromatography and flow injection analysis.
- Find methods accepted for USEPA compliance monitoring. These methods have # or ^ signs after the method number.
- Find methods with ERA support data. These methods have a * after the method number.

Performance Data Specifications

Range: The range quoted in the Lachat methods list is based on the calibrated range, which is the lowest calibration standard to the highest calibration standard.

MDL: The MDL (method detection limit) is calculated by the following protocols:

The Student's T number for the number of replicates is multiplied by the standard deviation calculated from those replications.

If 7 replicates are used: The Student's T value is 3.14.

If 21 replicates are used: The Student's T value is 2.528.

Example for 21 replicates: $2.528 \times 0.123 = 0.39$ for an MDL

Quantitation Limit: Quantitation limit is typically 3 to 5 times the calculated MDL or 10X the standard deviation of the MDL standard used.

Part Numbers Versus Method Numbers

To convert Method Numbers to part numbers, place an E in front of the Method Number.

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This is a list of the reaction modules presently available for use with QuikChem® instruments. The analytical capabilities of these instruments are not limited to these methods. The Lachat Applications group regularly adds new methods to this list. Requests for custom and proprietary methods development or consulting can be sent to Lachat Sales at 800-247-7613 or sales@lachatinstruments.com.

Methods, other than those listed as EPA-Accepted, were developed to meet individual customer requirements. In order to ensure that Lachat methods exactly meet the requirements of your application, please contact your local Sales Representative or Distributor.

When you have purchased a manifold, a copy of the method will be sent with a manifold diagram. Copies of methods without manifold diagrams are available to Lachat customers upon request.

Lachat QuikChem[®] Method Number Key

XX - **XXX** - **XX** - **X** - **X**
matrix - **analyte** - **form** - **chemistry** - **concentration**

Matrix:

10	Waters, wastewaters	11	Seawater
12	Soil extracts	13	Plant or soil digests
14	Fertilizer digests	15	Feeds & forages
16	Blood serum, plasma	17	Pharmaceuticals
18	Aqueous formulations	19	Plating baths / mineral processing
20	Food stuffs	21	Beverages
22	Detergents	23	Bioreactor solutions
24	Extracts of air sampling filters	25	Chlor-Alkali
26	Tobacco extracts	27	Urine
30	Brackish waters	31	Brackish or seawater
40	Non-aqueous	50	Dilute seawater
60	Biological fluids	70	High purity water

Analyte:

The first three numbers indicate the predominate chemical moiety.

Class

510	Anions	511	Rapid IC Anions
512	Rapid Sulfate	520	Cations
530	Metals	540	Oxyhalides
550	Organic Acids		

Element

105	Boron	107	Nitrogen
109	Fluorine	111	Sodium
112	Magnesium	113	Aluminum
114	Silicate	115	Phosphorus
116	Sulfur	117	Chlorine
119	Potassium	120	Calcium
123	Molybdenum	124	Chromium (Hexavalent)
125	Uranium	126	Iron
127	Beryllium	128	Nickel
129	Copper	130	Zinc
131	Manganese	135	Bromine
136	Iodine	138	Mercury
140	Carbon	141	Chromium (Total)

Enzymes

401	Protease	402	Amylase
403	Lactate dehydrogenase (LDH)	404	Catalase

Molecules

201	Reducing sugars (Total)	202	Nicotine
203	Glucose	204	Cyanide
206	Urea	207	Lactic acid, D (-)
208	Lowry protein (albumin)	209	Hydrogen peroxide
210	Phenol	212	Glucan (beta-Glucan)
213	Citric acid	214	Ethanol
215	Penicillin	216	Carbon dioxide
217	Hydrazine	218	Total amino acids
219	Ascorbic acid	220	Riboflavin
221	Formaldehyde	223	Humic acid
224	Chlorate	225	Hydroxide
226	Hypochlorite	227	Creatinine
228	Sorbic acid	229	Thiocyanate
230	Pyruvate	231	Polyvinyl alcohol (PVA)
232	Glutamate	233	Glutamine
234	CMC	235	Glycerol
236	Erythromycin	237	Free amino nitrogen
238	Methanol	239	Glycolate
240	Sebacate	241	Sulfur dioxide
243	Hydroxy-Proline	244	Amylose
245	Monochloramine		

Parameters

301	Hardness (Total)	302	Conductivity
303	Alkalinity	304	pH
305	Acidity	306	Surfactants
307	Oxygen	308	Color

Form:

The method either determines this form of the analyte or converts the analyte to this form for determination.

00	Form given by previous three numbers	01	Phosphate (PO_4^{3-})
02	Calcium (Ca^{2+})	03	Potassium (K^+)
04	Nitrate (NO_3^-)	05	Nitrite (NO_2^-)
06	Ammonium (NH_4^+), Ammonia (NH_3)	07	Chloride (Cl^-)
08	Boric Acid (H_3BO_3)	09	Iodide (I^-)
10	Sulfate (SO_4^{2-})	11	Sulfite (SO_3^{2-})
12	Fluoride (F^-)	13	Chromium (VI) (Cr)
14	Chromium (Cr $^{3+}$)	15	Cobalt (II) (Co^{2+})
16	Nickel (II) (Ni^{2+})	17	Copper (III) (Cu^{2+})
18	Total Iron ($\text{Fe}^{2+} + \text{Fe}^{3+}$)	19	Iron (II) (Fe^{2+})
20	Iron (III), (Fe^{3+})	21	Bromide (Br^-)
22	Silver (I)	23	Molybdenum (VI) (Mo)
24	Hydronium (H_3O^+ , H^+)	25	Hydroxide (OH^-)
26	Magnesium (Mg^{2+})	27	Silicate (SiO_2)
29	Sulfide (S^{2-})	30	Acidity (volatile)
31	Calcium carbonate (CaCO_3)	32	Sodium cation (Na^+)
33	Aluminum (inorganic) (Al)	34	Aluminum (organic) (Al)
35	Chlorate (ClO_3^-)	36	Hypochlorite (OCl^-)
37	Mercury (atomic) (Hg)	38	Sorbate
39	Carbon dioxide (CO_2)	40	Perchlorate
41	Iodate (IO_3^-)	42	Sulfur dioxide
43	Trans-4		

Chemistry:

Some analytes have more than one chemistry.

Example:

Ammonia	10-107-06-1	phenolate, phenate
	10-107-06-2	salicylate

Concentration:

Each range of concentrations for an analyte is given by a single letter. See the methods list for the ranges.

What's New

These Lachat methods were introduced since the last Lachat Method's List, from November 2008 to February 2009. For more information on any of these methods, please contact Lachat Technical Support.

Method Number	Analyte	Range	Comments
WATER AND WASTEWATER			
10-107-04-5-A	Nitrate-Nitrite	0.2 – 20; 0.02 – 5.0 mg N/L	Nitrate Reductase method; two ranges
10-210-00-3-C [^]	Total Phenolics	2 – 200 µg phenol/L	Equivalent to USEPA 420.4
10-308-00-1-B	Color	25 – 250 Pt-Co color units	Uses 450 nm filter
BRACKISH AND SEAWATER			
30-107-04-1-C [^]	Nitrate-Nitrite	0.05 – 2.0 mg N/L	Uses 50% ASW carrier; two ranges
31-107-04-1-H [^]	Nitrate-Nitrite	0.25 – 30 mg N/L	High range method
31-107-04-5-A	Nitrate-Nitrite	0.02 – 5.0 mg N/L	Nitrate Reductase method
31-107-05-1-B [^]	Nitrite	0.1 – 15 mg N/L	High range method
31-107-06-1-G [^]	Ammonia	1.25 – 100 µg N/L as NH ₃	Trace-level method; 2 cm detector required
31-107-06-1-H [^]	Ammonia	0.25 – 30 mg N/L as NH ₃	Ultra-high throughput method: ~120 samples/hr; High range method
31-114-27-1-F [^]	Silicate	0.5 – 30 µg Si/L	High range method
31-115-01-3-F [^]	Total Phosphorus	2 – 100 µg P/L	Low level method
SOILS			
12-107-04-5-A	Nitrate	0.2 – 20 mg N/L	Nitrate Reductase method; 2M KCl extracts
ION CHROMATOGRAPHY			
10-510-00-1-E [^] #	Anions	Various	Omnion 3.0; 6.5 minute cycle
10-540-00-1-C #	Oxyhalides	Various	Omnion 3.0; disinfection byproducts
21-510-00-1-A	Anions	Various	Omnion 3.0; beverages; 6.5 minute cycle
21-550-00-1-B	Organic Acids	Various	Omnion 3.0; beverages
70-510-00-1-C	Anions	Various	Omnion 3.0; trace level anions
AQUEOUS SOLUTIONS			
18-226-36-1-A	Hypochlorite	0.05 – 2.0 g NaOCl/L	Gas diffusion method; for bleach and other commercial products containing NaOCl
REVISED METHODS			
10-510-00-1-A #	Anions	Various	Removed IC5000 and QC8000 information

USEPA Accepted Methods

[^] USEPA Equivalent Methods

* Methods with External Quality Standards

Method Number	Analyte	Range	Comments
26-201-00-1-B	Reducing Sugars	10 – 500 mg glucose/L	Omnion 3.0 support data added; for tobacco extracts
30-107-04-1-A ^	Nitrate-Nitrite	0.05 – 1.0 mg N/L	Omnion 3.0 support data; uses 50% ASW carrier
31-126-18-1-A			

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

USEPA Accepted Methods

List of QuikChem® Methods considered "Permitted Options in the Accepted Methods" for the National Pollutant Discharge Elimination (NPDES) program of the U.S. Environmental Protection Agency (USEPA):

Alkalinity		
10-303-31-1-A		
Ammonia		
10-107-06-1-B	10-107-06-1-C	10-107-06-1-I
10-107-06-1-J	10-107-06-1-K	30-107-06-1-A
Bromide		
10-510-00-1-A		
Chloride		
10-117-07-1-A	10-117-07-1-B	10-117-07-1-H
10-117-07-1-I	10-510-00-1-A	
Chromium (Hexavalent)		
10-124-13-1-A		
Conductivity		
10-302-00-1-A	10-302-00-1-B	
Cyanide		
10-204-00-1-A	10-204-00-1-X	
Fluoride		
10-109-12-2-A	10-510-00-1-A	
Hardness, Total		
10-301-31-1-B		
Kjeldahl Nitrogen (TKN)		
10-107-06-2-D	10-107-06-2-E	10-107-06-2-M
Nitrate		
10-510-00-1-A		
Nitrate + Nitrite		
10-107-04-1-A	10-107-04-1-B	10-107-04-1-C
10-107-04-1-J	10-107-04-1-K	10-107-04-1-L
10-107-04-1-O	10-107-04-2-A	10-107-04-2-B
10-107-04-2-D		
Nitrite		
10-510-00-1-A		
Phenol		
10-210-00-1-A	10-210-00-1-B	
Phosphate, ortho		
10-115-01-1-A	10-115-01-1-B	10-115-01-1-M
10-115-01-1-P	10-115-01-1-Q	10-115-01-1-T
10-510-00-1-A		
Phosphorus		
10-115-01-1-C	10-115-01-1-D	10-115-01-1-E
10-115-01-1-F	10-115-01-2-B	
Silicate		
10-114-27-1-A		
Sulfate		
10-116-10-2-A	10-116-10-2-B	10-510-00-1-A

USEPA Accepted Methods

List of QuikChem® Methods considered "Permitted Options in the Accepted Methods" for the National Primary Drinking Water Regulations (NPDWR) program of the U.S. Environmental Protection Agency (USEPA):

Ammonia		
10-107-06-1-J		
Bromate		
10-540-00-1-C		
Bromide		
10-510-00-1-A	10-510-00-1-E	10-540-00-1-C
Chlorate		
10-540-00-1-C		
Chloride		
10-117-07-1-A	10-117-07-1-B	10-510-00-1-A
10-510-00-1-E	10-511-00-1-A	10-540-00-1-C
Conductivity		
10-302-00-1-A	10-302-00-1-B	
Cyanide		
10-204-00-1-A	10-204-00-1-X	
Fluoride		
10-109-12-2-A	10-510-00-1-A	10-510-00-1-E
Nitrate		
10-510-00-1-A	10-510-00-1-E	10-511-00-1-A
Nitrate + Nitrite		
10-107-04-1-A	10-107-04-1-B	10-107-04-1-C
10-107-04-1-J	10-107-04-1-K	10-107-04-1-L
10-107-04-1-O	10-107-04-1-R	10-107-04-2-A
10-107-04-2-B		
Nitrite		
10-107-05-1-A	10-510-00-1-A	10-510-00-1-E
Phosphate, ortho		
10-115-01-1-A	10-115-01-1-B	10-115-01-1-M
10-115-01-1-P	10-115-01-1-Q	10-115-01-1-T
10-115-01-1-V	10-510-00-1-A	10-510-00-1-E
10-511-00-1-A		
Sulfate		
10-510-00-1-A	10-510-00-1-E	10-511-00-1-A

USEPA Equivalent Methods

List of QuikChem® Methods considered Equivalent Methods for the National Pollutant Discharge Elimination System (NPDES) program of the US Environmental Agency (USEPA) Method Update Rule (MUR), dated March 12, 2007:

Alkalinity		
10-303-31-1-D		
Ammonia		
10-107-06-1-F	10-107-06-1-M	10-107-06-1-O
10-107-06-1-X	10-107-06-2-A	10-107-06-2-L
10-107-06-2-O	10-107-06-3-F	10-107-06-6-A
10-107-06-6-B	31-107-06-1-B	31-107-06-1-F
31-107-06-1-G	31-107-06-1-H	
Bromide		
10-510-00-1-E		
Chloride		
10-117-07-1-C	10-117-07-1-E	10-510-00-1-E
Chromium (Hexavalent)		
10-124-13-1-B		
Cyanide		
10-204-00-1-B	10-204-00-1-F	10-204-00-1-X
10-204-00-2-C	10-204-00-2-D	10-204-00-2-E
10-204-00-5-A		
Fluoride		
10-109-12-2-B	10-109-12-2-C	10-109-12-2-D
10-510-00-1-E		
Hardness, Total		
10-301-31-1-A		
Kjeldahl Nitrogen (TKN)		
10-107-06-2-H	10-107-06-2-I	10-107-06-2-K
10-107-06-2-N	10-107-06-2-P	10-107-06-6-C
Nitrate		
10-510-00-1-E		
Nitrate + Nitrite		
10-107-04-1-F	10-107-04-1-H	10-107-04-1-Q
10-107-04-1-R	30-107-04-1-A	30-107-04-1-C
31-107-04-1-A	31-107-04-1-C	31-107-04-1-D
31-107-04-1-E	31-107-04-1-F	31-107-04-1-G
31-107-04-1-H		
Nitrite		
10-107-05-1-A	10-107-05-1-B	10-107-05-1-C
10-107-05-1-O	10-510-00-1-E	31-107-05-1-A
31-107-05-1-B		
Phenol		
10-210-00-1-X	10-210-00-1-Y	10-210-00-3-C
Phosphate, ortho		
10-115-01-1-O	10-115-01-1-V	10-115-01-1-W
10-115-01-1-Y	10-510-00-1-E	31-115-01-1-G
31-115-01-1-H	31-115-01-1-I	31-115-01-1-J
31-115-01-1-W	31-115-01-1-Y	
Phosphorus		
10-115-01-1-I	10-115-01-3-A	10-115-01-3-B
10-115-01-3-C	10-115-01-3-E	10-115-01-3-F
10-115-01-4-I	10-115-01-4-S	10-115-01-4-U
31-115-01-3-D	31-115-01-3-F	31-115-01-4-A
Silicate		
10-114-27-1-B	10-114-27-1-C	31-114-27-1-A
31-114-27-1-B	31-114-27-1-D	31-114-27-1-E
31-114-27-1-F		
Sodium		
10-111-32-1-A		

Sulfate		
10-116-10-1-A	10-116-10-1-C	10-116-10-1-E
10-116-10-1-G	10-116-10-2-E	10-510-00-1-E
Sulfide		
10-116-29-1-A	10-116-29-1-C	10-116-29-3-A
10-116-29-3-B		
Surfactants		
10-306-00-1-C	10-306-00-1-D	

ISO Accepted Methods

11732		
10-107-06-5-B	10-107-06-5-E	10-107-06-5-F
10-107-06-5-G	10-107-06-5-H	
15682		
10-117-07-1-A	10-117-07-1-B	
23913		
10-141-13-2-A		

Method No	Range	MDL	Matrix	Comments	Rev Date
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Ion Chromatography

Anions

10-510-00-1-A1 #			Waters and water extracts of soil	USEPA method 300.0 (A), 100 µL loop, Run time: 11 min.	29-Nov-01
Bromide	0.05 – 5.0	0.018	mg Br ⁻ /L		
Chloride	0.5 – 50.0	0.004	mg Cl ⁻ /L		
Fluoride	0.05 – 5.0	0.004	mg F ⁻ /L		
Nitrate	0.05 – 5.0	0.004	mg NO ₃ ⁻ - N/L		
Nitrite	0.05 – 5.0	0.008	mg NO ₂ ⁻ - N/L		
Phosphate, ortho	0.05 – 5.0	0.012	mg HPO ₄ ²⁻ - P/L		
Sulfate	1.0 – 100	0.012	mg SO ₄ ²⁻ /L		
10-510-00-1-A2 #			Waters and water extracts of soil	USEPA method 300.0 (A), High-range method, 100 µL loop, Run time: 11 min.	29-Nov-01
Bromide	0.1 – 5	NA	mg Br ⁻ /L		
Chloride	2 – 100	NA	mg Cl ⁻ /L		
Fluoride	0.2 – 10	NA	mg F ⁻ /L		
Nitrate	0.2 – 10	NA	mg NO ₃ ⁻ - N/L		
Nitrite	0.1 – 5	NA	mg NO ₂ ⁻ - N/L		
Phosphate, ortho	0.2 – 10	NA	mg HPO ₄ ²⁻ - P/L		
Sulfate	4 – 200	NA	mg SO ₄ ²⁻ /L		
10-510-00-1-A3 #			Waters and water extracts of soil	USEPA method 300.0 (A), Low-range method, 200 µL loop, Run time: 11 min.	29-Nov-01
Bromide	0.025 – 2.5	0.005	mg Br ⁻ /L		
Chloride	0.25 – 25	0.012	mg Cl ⁻ /L		
Fluoride	0.025 – 2.5	0.004	mg F ⁻ /L		
Nitrate	0.025 – 2.5	0.002	mg NO ₃ ⁻ - N/L		
Nitrite	0.025 – 2.5	0.005	mg NO ₂ ⁻ - N/L		
Phosphate, ortho	0.025 – 2.5	0.003	mg HPO ₄ ²⁻ - P/L		
Sulfate	0.5 – 50	0.003	mg SO ₄ ²⁻ /L		
10-510-00-1-A4 #			Waters and water extracts of soil	USEPA method 300.0 (A), Chloride to Nitrite-N ratio 800:1, Run time: 16 min.	29-Nov-01
Bromide	0.16 – 3.0	0.02	mg Br ⁻ /L		
Chloride	32 – 600	NA	mg Cl ⁻ /L		
Fluoride	0.04 – 0.75	0.008	mg F ⁻ /L		
Nitrate	0.04 – 0.75	0.005	mg NO ₃ ⁻ - N/L		
Nitrite	0.04 – 0.75	0.02	mg NO ₂ ⁻ - N/L		
Phosphate, ortho	0.10 – 1.875	0.02	mg HPO ₄ ²⁻ - P/L		
Sulfate	32 – 600	NA	mg SO ₄ ²⁻ /L		
10-510-00-1-C			Waters, wastewaters	Common inorganic anions, 50 µL sample loop, Run time: 14 min.	08-Sep-03
Bromide	0.06 – 6.0	0.02	mg Br ⁻ /L		
Chloride	0.6 – 60	0.005	mg Cl ⁻ /L		
Fluoride	0.04 – 4.0	0.006	mg F ⁻ /L		
Nitrate	0.06 – 6.0	0.007	mg NO ₃ ⁻ - N/L		
Nitrite	0.016 – 1.6	0.002	mg NO ₂ ⁻ - N/L		

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Phosphate, ortho Sulfate	0.06 – 6.0 2.0 – 200	0.015 0.03	mg HPO ₄ ²⁻ - P/L mg SO ₄ ²⁻ /L		
10-510-00-1-E1 ^#			Waters, wastewaters	Fast IC, Separation of all seven common anions in 6.5 minutes, 3 ranges included, Omnion 3.0 only.	31-Oct-08
Bromide Chloride Fluoride Nitrate Nitrite Phosphate, ortho Sulfate	0.05 – 5.0 0.5 – 50 0.05 – 5.0 0.05 – 5.0 0.05 – 5.0 0.05 – 5.0 1.0 – 100	0.016 0.029 0.004 0.008 0.033 0.015 0.02	mg Br ⁻ /L mg Cl ⁻ /L mg F ⁻ /L mg NO ₃ ⁻ - N/L mg NO ₂ ⁻ - N/L mg HPO ₄ ²⁻ - P/L mg SO ₄ ²⁻ /L		
10-510-00-1-E2 ^#			Waters, wastewaters	Low range.	31-Oct-08
Bromide Chloride Fluoride Nitrate Nitrite Phosphate, ortho Sulfate	0.025 – 2.5 0.015 – 2.5 0.025 – 2.5 0.025 – 2.5 0.025 – 2.5 0.025 – 2.5 0.5 – 50	0.015 0.006 0.003 0.0048 0.0048 0.0098 0.020	mg Br ⁻ /L mg Cl ⁻ /L mg F ⁻ /L mg NO ₃ ⁻ - N/L mg NO ₂ ⁻ - N/L mg HPO ₄ ²⁻ - P/L mg SO ₄ ²⁻ /L		
10-510-00-1-E3 ^#			Waters, wastewaters	High range.	31-Oct-08
Bromide Chloride Fluoride Nitrate Nitrite Phosphate, ortho Sulfate	0.1 – 5 2.0 – 100 0.2 – 10.0 0.2 – 10.0 0.1 – 5.0 0.2 – 10.0 4.0 – 200	0.038 0.016 0.016 0.029 0.010 0.034 0.144	mg Br ⁻ /L mg Cl ⁻ /L mg F ⁻ /L mg NO ₃ ⁻ - N/L mg NO ₂ ⁻ - N/L mg HPO ₄ ²⁻ - P/L mg SO ₄ ²⁻ /L		
10-510-13-1-A *			Waters	USEPA method 218.6, Chromium (VI) w/ post-column derivatization, Run time: 5.5 minutes.	09-Sep-03
Chromate	0.2 – 10	0.06	µg Cr(VI)/L		
10-511-00-1-A1 #			Waters, wastewaters	Rapid IC for anions, 50 µL loop, Run time: 4 min.	23-Jan-02
Chloride Nitrate Phosphate, ortho Sulfate	1.0 – 100 0.2 – 20.0 0.05 – 5.0 1.0 – 100	0.004 0.003 0.006 0.014	mg Cl ⁻ /L mg NO ₃ ⁻ - N/L mg HPO ₄ ²⁻ - P/L mg SO ₄ ²⁻ /L		
10-511-00-1-A2 #			Waters, wastewaters	High-range method, 25 µL loop, Run time: 4 min.	10-Nov-99
Chloride Nitrate Phosphate, ortho Sulfate	1.5 – 150 0.25 – 25 0.1 – 10 2.5 – 250	0.01 0.005 0.016 0.04	mg Cl ⁻ /L mg NO ₃ ⁻ - N/L mg HPO ₄ ²⁻ - P/L mg SO ₄ ²⁻ /L		

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
10-540-00-1-C #			Waters, wastewaters	USEPA method 300.1, Disinfection byproducts, Run time: 38 min., use Omnion 3.0.	25-Nov-08
Bromate	5 – 50	1.15	µg BrO ₃ ⁻ /L		
Bromide	10 – 100	2.01	µg Br ⁻ /L		
Chlorate	20 – 200	5.00	µg ClO ₃ ⁻ /L		
Chlorite	5 – 50	2.61	µg ClO ₂ ⁻ /L		
21-510-00-1-A			Beverages		03-Feb-09
Chloride	1 – 50	0.045	mg Cl ⁻ /L		
Fluoride	0.2 – 10	0.037	mg F ⁻ /L		
Nitrate	0.2 – 10	0.021	mg NO ₃ ⁻ - N/L		
Phosphate, ortho	4 – 200	0.062	mg HPO ₄ ²⁻ - P/L		
Sulfate	4 – 200	0.102	mg SO ₄ ²⁻ /L		
70-510-00-1-C			High purity waters	Trace-level method	16-Jan-09
Bromide	2 – 40	0.67	µg Br ⁻ /L		
Chloride	1 – 20	0.22	µg Cl ⁻ /L		
Fluoride	1 – 20	0.39	µg F ⁻ /L		
Nitrate	1 – 20	0.20	µg NO ₃ ⁻ - N/L		
Nitrite	1 – 20	0.40	µg NO ₂ ⁻ - N/L		
Phosphate, ortho	3 – 60	0.60	µg HPO ₄ ²⁻ - P/L		
Sulfate	1.5 – 30	0.45	µg SO ₄ ²⁻ /L		
Cations					
10-520-00-1-D1				For use with Omnion 3.0	16-Feb-05
Ammonium	0.8 – 32	0.16	mg NH ₄ ⁺ /L		
Calcium	1.6 – 64	0.60	mg Ca ²⁺ /L		
Lithium	0.25 – 10	0.05	mg Li ⁺ /L		
Magnesium	0.8 – 32	0.16	mg Mg ²⁺ /L		
Potassium	1.6 – 64	0.32	mg K ⁺ /L		
Sodium	1.8 – 72	0.36	mg Na ⁺ /L		
10-520-00-1-D2				For use with Omnion 3.0	16-Feb-05
Ammonium	0.2 – 4.0	0.04	mg NH ₄ ⁺ /L		
Calcium	0.25 – 5.0	0.053	mg Ca ²⁺ /L		
Lithium	0.05 – 1.0	0.01	mg Li ⁺ /L		
Magnesium	0.25 – 5.0	0.05	mg Mg ²⁺ /L		
Potassium	0.2 – 4.0	0.04	mg K ⁺ /L		
Sodium	0.2 – 4.0	0.04	mg Na ⁺ /L		
10-520-00-1-D3				For use with Omnion 3.0	17-Feb-09
Ammonium	5 – 250	3.49	µg NH ₄ ⁺ /L		
Calcium	25 – 1,250	7.44	µg Ca ²⁺ /L		
Lithium	8 – 400	0.58	µg Li ⁺ /L		
Magnesium	12 – 600	2.60	µg Mg ²⁺ /L		
Potassium	20 – 1,000	5.74	µg K ⁺ /L		
Sodium	10 – 500	1.44	µg Na ⁺ /L		
Organic Acids					
21-550-00-1-B			Beverages	Use with Omnion 3.0.	03-Feb-09
Acetic Acid	3 – 300	1.16	mg/L		
Adipic Acid	4.5 – 450	3.34	mg/L		
Citric Acid	3 – 300	0.45	mg/L		

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Formic Acid	3 – 300	0.50	mg/L		
Fumaric Acid	3 – 300	0.45	mg/L		
Lactate / Lactic Acid	3 – 300	0.90	mg/L		
Malic Acid	3 – 300	0.60	mg/L		
Malonic Acid	3 – 300	1.07	mg/L		
Oxalic Acid	3 – 300	0.71	mg/L		
Succinic Acid	3 – 300	0.77	mg/L		
Tartaric Acid	3 – 300	0.92	mg/L		

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
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Flow Injection Analysis

Acidity

10-305-31-1-A	30 – 500 mg CaCO ₃ /L	4	Waters	Thymol Blue	02-Sep-03
10-305-31-1-B	1.0 – 30.0 mg CaCO ₃ /L	0.19	Waters	Thymol Blue	02-Sep-03
21-305-24-1-A	0.10 – 1.50 g tartaric acid/ 100 mL	NA	Wines	Bromocresol Purple, AE support data	16-Sep-03

Alkalinity

10-303-31-1-A #	10 – 500 mg CaCO ₃ /L	2.3	Waters	Methyl Orange	23-Jan-01
10-303-31-1-D ^	1 – 50 mg CaCO ₃ /L	0.27	Waters, wastewaters	Methyl Orange	02-Sep-03
10-303-31-2-B	10 – 200 mg CaCO ₃ /L	3.0	Waters	Phenolphthalein	02-Sep-03
10-303-31-3-A *	50 – 400 mg CaCO ₃ /L	2.7	Waters	Bromocresol Green	02-Sep-03
10-303-31-4-A	50 – 500 mg CaCO ₃ /L	1.1	Waters	Bromocresol Green / Methyl Red, Low-flow method	02-Sep-03

Aluminum

10-113-33-1-B	0.1 – 5.0 mg Al/L	0.02	Waters	Total reactive Al (0.15% HNO ₃)	27-Aug-03
10-113-33-1-C	10 – 300 µg Al/L	1.0	Waters, wastewaters	Replaces method 10-113-33-1-A	25-Apr-08
10-113-34-1-B	0.01 – 0.3 mg Al/L	0.0015	Waters	Non-exchangeable Al, AE support data	27-Aug-03
12-113-33-1-B	1.0 – 30 mg Al/L	0.1	Soil extracts	1 M KCl extracts	02-Sep-03
13-113-33-1-B	0.8 – 4.0 mg Al/L	0.05	Plant tissue	2.5 – 200 mg Al/kg plant tissue; Low-flow method	02-Sep-03

Ammonia

Alkaline Phenol (Phenate) based methods

10-107-06-1-B # *	0.05 – 5.0 mg N/L as NH ₃	0.007	Waters	0.2% H ₂ SO ₄ preserved samples	27-Aug-01
10-107-06-1-C #	0.01 – 4.0 mg N/L as NH ₃	0.004	Waters	Non-preserved samples	02-Nov-01
10-107-06-1-F ^	10 to 100 µg N/L as NH ₃	1.0	Waters	Low-flow method	26-Aug-03
10-107-06-1-G	10 – 500 µg N/L as NH ₃	0.00153	Waters, wastewaters	Omnion 3.0 support data. Ultra-High Throughput method: ~ 100 injections / hr; can use green sample line; EPA 365.3	14-Dec-07
10-107-06-1-I #	0.1 – 30.0 mg N/L as NH ₃	0.01	Waters		15-Mar-01
10-107-06-1-J #	0.01 – 2.0 mg N/L as NH ₃	0.002	Waters	Low-flow method; preserved and non-preserved samples	01-Mar-01

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
10-107-06-1-K #	0.2 – 20.0 mg N/L as NH ₃	0.01	Waters	Low-flow method	15-Mar-01
10-107-06-1-L	0.02 – 2.0 mg N/L as NH ₃	0.0028	Waters, wastewaters	For use in conjunction w/ 10-245-00-1-A for monochloramine or alone	09-Nov-07
10-107-06-1-M ^	0.01 – 2.0 mg N/L as NH ₃	0.002	Waters, wastewaters	Also covers 0.2 – 20 mg N/L. MDL 0.011 mg N/L; Acid preserved or non-acid preserved samples	12-Nov-07
10-107-06-1-O ^	2 – 500 µg N/L as NH ₃	0.56	Waters, wastewaters	Reworked method; 2 ranges; 2-500 µg N/L as NH ₃ and 0.25 – 10 mg N/L as NH ₃	22-Feb-08
10-107-06-1-X ^	0.05 – 20.0 mg N/L as NH ₃	0.007	Waters	MicroDIST®; low-flow method	26-Aug-03
10-107-06-3-F ^	1.25 – 100 µg N/L as NH ₃	0.41	Waters, wastewaters	Uses DCIC for hypochlorite source; QC8500 only; requires 2 cm detector	17-Feb-09
10-107-06-6-B ^	0.25 – 10 mg N/L as NH ₃	0.066	Waters, wastewaters	Inline ammonia distillation; phenate method; particulates need review prior to sale	01-Aug-08
12-107-06-1-A	0.01 – 1.0 mg N/L as NH ₃	0.002	Soil Extracts	2 M KCl extracts of soils	17-Sep-08
12-107-06-1-B	1.0 – 20.0 mg N/L as NH ₃	NA	Soil Extracts	2 M KCl extracts of soils	15-Sep-08
14-107-06-1-A	1.75 – 7.0 % N/L as NH ₃	NA	Liquid Fertilizers	Uses DCIC instead of NaOCl	02-Sep-03
14-107-06-1-B	5.0 – 180 mg N/L as NH ₃	0.5	Fertilizers	0.2 – 18% N; 0.48 M HCl	02-Sep-03
14-107-06-1-C	60 – 600 mg N/L as NH ₃	1.33	Fertilizers	0.38 – 15% N; uses DCIC instead of NaOCl	21-Aug-03
14-107-06-1-D	1.5 – 150 mg N/L as NH ₃	0.05	Fertilizers	6.0 – 15%; DCIC	21-Aug-03
30-107-06-1-A #	0.1 – 20.0 mg N/L as NH ₃	NA	Brackish waters	Distillation; QCIV support data; 0.007 – 1.43 M N/L	14-Nov-01
31-107-06-1-B ^	5 – 600 µg N/L as NH ₃	0.7	Brackish, seawater	0.36 – 42.86 µM N/L as NH ₃	07-Jan-02
31-107-06-1-F ^	0.005 – 2.0 µg N/L as NH ₃	0.002	Brackish, seawater	Samples w/ 0 – 35 ppt salinity; w/ Brackish integration: MDL 0.0028 mg N/L as NH ₃	12-Nov-07
31-107-06-1-G ^	1.25 – 100 µg N/L as NH ₃	0.41	Brackish, seawater	QC8500 only; requires 2 cm detector	30-Oct-08
31-107-06-1-H ^	0.25 – 30 mg N/L as NH ₃	0.025	Brackish, seawater	High range for seawater; can be used for non-saline as well; Ultra-High Throughput method: ~ 120 injections / hr	31-Oct-08
Gas Diffusion methods					
10-107-06-5-B	0.10 – 1.0 mg N/L as NH ₃	0.01	Waters	Gas diffusion / pH indicator; low-flow method	19-Mar-04
10-107-06-5-E	0.1 – 10.0 mg N/L as NH ₃	0.02	Waters, wastewaters	Gas diffusion / pH indicator	18-Mar-04
10-107-06-5-G	0.1 – 0.9 mg N/L as NH ₃	0.005	Waters, wastewaters	Also covers range 1 – 9 mg N/L as NH ₃ ; MDL of 0.011 mg N/L as NH ₃	08-Sep-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
10-107-06-5-H	10 – 90 µg N/L as NH ₃	1.5	Waters, wastewaters	Based on ISO method 11732	23-Mar-04
31-107-06-5-A	2.5 – 10 µg N/L as NH ₃	0.091	Brackish, seawater	Gas diffusion / pH indicator ; needs special care – please review w/ sales; 16 – 140 µg N/L as NH ₃	16-Sep-03
Sodium Salicylate based methods					
10-107-06-2-A * ^	0.10 – 5.0 mg N/L as NH ₃	0.005	Waters		26-Aug-03
10-107-06-2-L * ^	0.05 – 20 mg N/L as NH ₃	0.01	Waters, wastewaters	Ultra-High Throughput method: 120 samples / hr	17-Aug-07
10-107-06-2-O ^	10 – 500 µg N/L as NH ₃	1.1	Waters	Also covers range 0.25 – 30 mg N/L as NH ₃ ; MDL 0.011 mg N/L as NH ₃	05-Dec-07
10-107-06-3-B	0.05 – 1.0 mg N/L as NH ₃	0.008	Waters	Uses DCIC instead of NaOCl	26-Aug-03
10-107-06-3-D	0.005 – 0.25 mg N/L as NH ₃	0.001	Waters	Uses DCIC instead of NaOCl	26-Aug-03
10-107-06-4-D	0.5 – 80.0 mg N/L as NH ₃	0.10	Waters	Dialysis, AE support data.	26-Aug-03
10-107-06-6-A ^	0.25 – 20 mg N/L as NH ₃	0.13	Waters, wastewaters	Salicylate Ammonia method w/ inline distillation; requires inline sample prep module (2 heaters); particulate containing samples require review prior to sale	01-Aug-08
12-107-06-2-A	0.10 – 20.0 mg N/L as NH ₃	0.035	Soil extracts	2 M KCl	02-Sep-03
12-107-06-2-E	0.05 – 10.0 mg N/L as NH ₃	0.016	Soil extracts	0.5 M K ₂ SO ₄	02-Sep-03
12-107-06-2-F	0.1 – 20 mg N/L as NH ₃	0.026	2M KCl	Ultra-High Throughput method: 120 samples / hr	22-Aug-07
12-107-06-3-A	2.0 – 40.0 mg N/L as NH ₃	0.11	Soil extracts	0.0125 M CaCl ₂ uses DCIC	02-Sep-03
12-107-06-3-B	0.2 – 4.0 mg N/L as NH ₃	0.01	Soil extracts	1.0 M KCl; uses DCIC	02-Sep-03
12-107-06-3-C	0.2 – 4.0 mg N/L as NH ₃	0.03	Soil extracts	0.0125 M CaCl ₂ uses DCIC instead of NaOCl	02-Sep-03
14-107-06-2-B	400 – 800 mg N/L as NH ₃	NA	Fertilizer	10 – 20% N	02-Sep-03
14-107-06-2-C	75 – 600 mg N/L as NH ₃	1.0	Fertilizer		02-Sep-03
23-107-06-3-A	10 – 1000 mg N/L as NH ₃	NA	Fermentation beers	0.58 – 58.82 mM NH ₃	02-Sep-03
26-107-06-4-A	10 – 50.0 mg N/L as NH ₃	0.151	Tobacco extracts	Dialysis; 0.005 M H ₂ SO ₄ uses DCIC	02-Sep-03
Amylose					
20-244-00-1-A	1 – 500 mg Amylose/L	0.044	Digests of rice	0.1 N NaOH matrix following the digest	20-Jul-07
Boron					
10-105-08-1-B	0.5 – 10.0 mg B/L	0.02	Waters	Azomethine-H	25-Aug-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
13-105-08-1-D	2.0 – 10.0 mg B/L	0.04	Plant tissue	4% HCl	03-Sep-03
13-105-08-1-E	1.0 – 4.0 mg B/L	0.10	Plant tissue	5 – 80 mg B/kg; 1 M HCl; low-flow method	03-Sep-03
31-105-08-1-A	0.1 – 5.0 mg B/L	0.047	Brackish, seawater	0 – 35 ppt salinity samples; uses black pump tube for sample line	07-Apr-08
70-105-08-2-A	0.25 – 10.0 µg BL	0.035	High-purity water	Fluorimetric	03-Sep-03

Bromide

See also IC section

10-135-21-2-B	0.5 – 10 mg Br ⁻ /L	0.075	Waters, wastewaters		03-Sep-03
18-135-21-2-B	0.5 – 10 mg Br ⁻ /L	0.05	Brine	In 0 – 30% w/v NaCl solutions	03-Sep-03
30-135-21-1-A	0.5 – 10.0 mg Br ⁻ /L	0.005	Brackish waters	Low-flow method	03-Sep-03
30-135-21-1-B	5.0 – 60.0 mg Br ⁻ /L	0.22	Brackish waters		03-Sep-03

Calcium

See also IC section and Hardness

10-120-02-1-B	0.5 – 50.0 mg Ca/L	0.07	Waters (diluted)	AE support data	04-Sep-03
10-120-02-1-C	20 – 500 mg Ca/L	1.1	Waters		04-Sep-03
14-120-02-1-B	5 – 120 mg Ca/L	0.5	Fertilizer	0.1 – 12% Ca; HCl digests	04-Sep-03
14-120-02-1-C	750 – 2000 mg Ca/L	NA	Fertilizer	20.0 – 50.0% as CaO	04-Sep-03
15-120-02-4-A	5 – 250 mg Ca/L	1	Feeds & forages	Kjeldahl digest; selenium catalyst	04-Sep-03

Chlorate

See also IC section

25-224-35-1-D	0.1 – 2.0 g NaClO ₃ /L	0.005	70 – 200 g NaOH/L	Ferrozine; diaphragm	04-Sep-03
25-224-35-1-E	0.5 – 10 ppm NaClO ₃	NA	29 – 34% w/w NaOH	Ferrozine; membrane	04-Sep-03
25-224-35-1-F	1.0 – 20 mg NaClO ₃ /kg	NA	6 – 36% w/w NaOH; 1 – 3% w/w NaCl	Ferrozine; membrane	04-Sep-03
25-224-35-1-G	0.1 – 2.0 g NaClO ₃ /L	0.005	50 – 200 g NaOH/L	Ferrozine; diaphragm; selective against Hypochlorite	04-Sep-03
25-224-35-1-H	0.25 – 3.0 mg NaClO ₃ /L	0.005	135 – 275 g NaOH/L; No NaOH	Ferrozine; selective against Hypochlorite	04-Sep-03
25-224-35-1-I	10 – 50 g NaClO ₃ /L	0.597	Chlor-Alkali	100 – 300 g NaCl/L w/ no NaOH in matrix; can accommodate up to 25g	18-Sep-03
25-224-35-1-J	5 – 60 mg NaClO ₃ /L	0.4	Chlor-Alkali	250 – 500 g NaOH/L matrix (25 – 50%)	18-Sep-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Chloride					
10-117-07-1-A # *	6 – 300 mg Cl ⁻ /L	0.15	Waters	Low-flow method	07-Sep-01
10-117-07-1-B #	2.5 – 100 mg Cl ⁻ /L	0.5	Waters		23-Mar-01
10-117-07-1-C ^	0.1 – 10.0 mg Cl ⁻ /L	0.017	Waters	Low-flow method	29-Aug-03
10-117-07-1-E ^	5.0 – 2000 mg Cl ⁻ /L	0.6	Waters		29-Aug-03
10-117-07-1-H #	2.5 – 100 mg Cl ⁻ /L	0.2	Waters		05-Apr-01
10-117-07-1-I #	50 – 1000 mg Cl ⁻ /L	1.0	Waters	Low-flow method	15-Aug-01
19-117-07-1-A	0.08 – 4.0 mg Cl ⁻ /L	0.02	25% sulfuric acid		04-Sep-03
19-117-07-1-B	5 – 40 mg Cl ⁻ /L	0.1	Plating baths, mineral processing	34% zinc sulfate	04-Sep-03
25-117-07-1-A	100 – 250 g NaCl/L	0.58	70 – 200 g NaOH/L	Diaphragm	04-Sep-03
25-117-07-1-B	5 – 100 ppm NaCl/L	NA	29 – 34% w/w NaOH	Membrane	04-Sep-03
25-117-07-1-C	175 – 200 g NaCl/L	3.0	No NaOH		04-Sep-03
Chromium (Hexavalent)			<i>See also IC section</i>		
10-124-13-1-A #	0.010 – 0.400 mg Cr(VI)/L	0.004	Waters	MDL w/ Omnion 3.0 is 0.35 µg Cr(VI)/L	09-Oct-00
10-124-13-1-B ^	2 – 200 µg Cr(VI)/L	0.27	Waters, wastewaters		18-Jun-04
Chromium, Total					
10-141-13-2-A	0.1 – 10 mg Cr/L	0.028	Waters, wastewaters	ISO based method 23913	18-Jun-04
Color					
10-308-00-1-B	25 – 250 Pt-Co color units	0.49	Waters, wastewaters		02-Dec-08
21-308-00-1-A	0.250 – 0.700 abs unit	NA	Beverages	Low-flow method	18-Sep-03
Conductivity					
10-302-00-1-A #	5.94 – 575 µS/cm	0.5	Waters		08-Nov-01
10-302-00-1-B #	146.9 – 6667 µS/cm	NA	Waters		08-Nov-01
10-302-00-1-E	1 – 5.0 µS/cm	0.01	DI or RO water		14-May-07
Copper			<i>See also IC section</i>		
10-129-17-1-A	0.03 – 3.0 Cu/L	NA	Waters, wastewaters	Bathocuproine; AE support data	16-Sep-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Cyanide					
10-204-00-1-A #	0.005 – 0.5 mg CN/L	0.0005	Waters	0.25 M NaOH matrix following digestion	01-Nov-01
10-204-00-1-B ^	0.50 – 50.0 mg CN/L	NA	Waters	0.25 M NaOH matrix following digestion; AE support data	12-Feb-01
10-204-00-1-D	0.20 – 10.0 mg CN/L	0.003	Waters	Acetate buffer; 0.25 M NaOH matrix following digestion	04-Dec-01
10-204-00-1-E	0.002 – 0.03 mg CN/L	0.00045	Waters	Acetate buffer; 0.25 M NaOH matrix following digestion; AE support data	16-Sep-03
10-204-00-1-F ^	50 – 500 mg CN/L	NA	Waters	Low-flow method; 0.25 M NaOH matrix following digestion	16-Sep-03
10-204-00-1-G	2.0 – 500 µg CN/L	0.5	Waters, wastewaters	0.25 M NaOH matrix following digestion; Pyridine-free reagents	16-Sep-03
10-204-00-1-H	2 – 100 µg CN/L	0.21	Waters, wastewaters	Also covers 0.10 – 5.0 mg CN/L; MDL is 0.03 mg CN/L; can be used w/ 10-204-00-2-G; inline total CN (pyridine free)	06-Apr-06
10-204-00-1-V	0.005 – 0.50 mg CN/L	0.0008	Waters	Midi distillation method; 0.25 M NaOH matrix following digestion	16-Sep-03
10-204-00-1-X #	0.005 – 0.50 mg CN/L	0.001	Waters	MicroDIST® method; 0.25 M NaOH matrix following digestion	20-Jul-01
10-204-00-1-X2 #^	0.002 – 0.5 mg CN/L	0.38 µg CN/L	Waters, wastewaters	Ultra-High Throughput method: >125 samples / hr.; MicroDIST® method	25-Sep-07
10-204-00-2-C ^	2 – 100 µg CN/L	0.21	Waters	Inline CN (total) method; settleable particulate samples are not suitable w/ method	08-Apr-04
10-204-00-2-D ^	5 – 500 µg CN/L	0.51	Waters, wastewaters	Inline CN (total) method; settleable particulate samples are not suitable w/ method	18-Aug-03
10-204-00-2-E ^	2 – 100 µg CN/L	0.5	Waters, wastewaters	Inline CN (total) method; lower recovery of ferricyanide; settleable particulate samples are not suitable w/ method	18-Aug-03
10-204-00-2-G	2 – 100 µg CN/L	0.40	Waters, wastewaters	Inline CN (total) – pyridine free; Also covers 0.10 – 5.0 mg CN/L; MDL is 0.012 mg CN/L; settleable particulate samples are not suitable w/ method; can be used w/ 10-204-00-1-H (free-CN, pyridine-free)	06-Apr-06

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
10-204-00-3-A	10 – 500 µg CN/L	1.0	Waters	Inline CN (weak acid dissociable) method; settleable particulate samples are not suitable w/ method.	04-Sep-03
10-204-00-4-B	2.0 – 100 µg CN/L	0.16	Waters, wastewaters	Inlinw XN (weak acid dissociable) method; includes two dedicated channels; pyridine-free method; settleable particulate samples are not suitable w/ method	18-Aug-03
10-204-00-5-A ^	2.0 – 400 µg CN/L	0.65	Waters, wastewaters	Amperometric detection w/ Ligand Exchange; Can be sold in US only	18-Aug-03
10-204-00-5-B	2 – 500 µg CN/L	0.914	Waters, wastewaters	Inline CN (total) method w/ amperometric detection; Can be sold in US only	02-Jun-08
10-204-00-5-X	5 –400 µg CN/L	0.975	Waters, wastewaters	MicroDIST® method using amperometric detection; can be sold in US only	02-Jun-08
12-204-00-2-A	2 – 200 µg CN/L	0.16	Soil extracts	For use w/ 1 M NaOH extracts of soils ONLY; non-pyridine	25-Aug-08

Fluoride

See also IC section

10-109-12-2-A #	0.10 – 5.0 mg F/L	0.05	Waters	Ion Selective Electrode	08-Nov-01
10-109-12-2-B ^	1 – 1000 mg F/L	0.14	Waters	Ion Selective Electrode	27-Aug-03
10-109-12-2-C ^	0.10 – 2.0 mg F/L	0.02	Waters	Ion Selective Electrode	27-Aug-03
10-109-12-2-D ^	0.10 – 10.0 mg F/L	0.03	Waters	Ion Selective Electrode	27-Aug-03
14-109-12-2-A	0.5 – 20 mg F/L	0.1	Fertilizer digests	Ion Selective Electrode	04-Sep-03
19-109-12-2-A	1.6 – 80 mg F/L	0.4	34% ZnSO ₄	Ion Selective Electrode	04-Sep-03
19-109-12-2-B	0.1 – 10 mg F/L	0.02	34% ZnSO ₄	Ion Selective Electrode	04-Sep-03

Formaldehyde

10-221-00-1-A	1.0 – 10.0 mg HCHO/L	0.033	Waters	Formaldehyde monitor extracts	09-Sep-03
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Free Amino Nitrogen

21-237-00-1-A	10 – 120 mg N/L	NA	Beer	Ninhydrin	05-Sep-03
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USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Hardness, Total					
10-301-31-1-A * ^	5 – 300 mg CaCO ₃ /L	0.331	Waters	Calmagite ; 80 samples / hr. ; chemistry is inverse (using 520 nm interference filter) to allow detection at lower levels	17-Mar-08
10-301-31-1-B # *	30 – 800 mg CaCO ₃ /L	5.4	Waters	Calmagite	18-Dec-00
10-301-31-1-C	125 – 1500 mg CaCO ₃ /L	17.0	Waters	Calmagite	09-Sep-03
Hydroxide					
25-225-25-1-A	70 – 200 g NaOH/L	10	Chlor-Alkali	EDA / copper sulfate; diaphragm	05-Sep-03
25-225-25-1-B	29 – 34% w/w NaOH	NA	Chlor-Alkali	EDA / copper sulfate; membrane	05-Sep-03
25-225-25-1-C	6 – 36% w/w NaOH	NA	Chlor-Alkali	EDA / copper sulfate	05-Sep-03
25-225-25-1-D	6 – 36% w/w NaOH	NA	Chlor-Alkali	EDA / copper sulfate	05-Sep-03
Hydroxy-Proline					
20-243-00-1-A	0.1 – 5.0 mg/L	0.007	Food stuffs	Also covers range of 1 – 40 mg/L w/ change in sample loop; final matrix 0.0138 M sulfuric acid; QC8500 only	12-Feb-07
Hypochlorite					
18-226-36-1-A	0.05 – 2.0 g NaOCl/L	3.3 mg	Aqueous formulations	Gas Diffusion	16-Jan-09
25-226-36-1-B	1.25 – 10 mg NaOCl/L	0.20	70 – 200 g NaOH/L	Methyl Orange / dialysis; diaphragm	05-Sep-03
25-226-36-1-C	18.75 – 150 mg NaOCl/L	0.77	70 – 200 g NaOH/L	Methyl Orange / dialysis; diaphragm	08-Sep-03
25-226-36-1-D	3.0 – 37.5 mg NaOCl/L	0.5	50 – 200 g NaOH/L	Potassium iodide; diaphragm	08-Sep-03
25-226-36-1-E	10 – 50 mg NaOCl/L	NA	50 – 150 g NaOH/L	Potassium iodide; diaphragm	08-Sep-03
25-226-36-1-F	3 – 75 mg NaOCl/L	NA	50 – 200 g NaOH/L	Potassium iodide; diaphragm	08-Sep-03
Iodate					
18-136-41-1-A	0.25 – 8.0 mg IO ₃ ⁻ /L	0.014	Aqueous formulations	In NaCl / H ₂ SO ₄ solutions	14-Jan-02
Iodide					
10-136-09-1-A	0.50 – 10.0 mg I ⁻ /L	0.3	Waters	0.2 M KOH	12-Sep-03
18-136-09-1-A	0.1 – 3.0 mg I ⁻ /L	0.02	Aqueous formulations	In NaCl / H ₂ SO ₄ solutions	12-Sep-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Iron					
10-126-18-1-A	0.1 – 5.0 mg Fe/L	0.01	Waters	Total soluble iron as Fe (II and III); TPTZ indicator	12-Sep-03
10-126-18-1-B	0.05 – 0.5 mg Fe/L	0.002	Waters	Total soluble iron as Fe (II and III); TPTZ indicator	12-Sep-03
10-126-18-1-C	1.0 – 5.0 mg Fe/L	0.01	Waters, wastewaters	Total iron as Fe (II and III); Thiocyanate	12-Sep-03
10-126-18-1-D	0.1 – 5.0 mg Fe/L	0.01	Waters, wastewaters	Total soluble iron as Fe (II and III); Ferrozine indicator; in 0.5% HNO ₃	12-Sep-03
31-126-18-1-B	0.05 – 0.500 mg Fe/L	0.004	Brackish, seawater	Total soluble iron as Fe (II and III); TPTZ indicator	15-Sep-03
31-126-19-1-A	0.50 – 30.0 mg Fe/L	0.23	Brackish, seawater	Total soluble iron as Fe (II); TPTZ indicator; AE support data	15-Sep-03
Kjeldahl Nitrogen (TKN)					
10-107-06-2-D #	0.5 – 20 mg N/L	0.07	Waters	Kjeldahl digests; Mercury catalyst	07-Nov-01
10-107-06-2-E #	0.1 – 5.0 mg N/L	0.018	Waters	Kjeldahl digests; Mercury catalyst	03-Jan-02
10-107-06-2-H ^	0.1 – 5.0 mg N/L	0.034	Waters	Kjeldahl digests; Copper catalyst	21-Aug-03
10-107-06-2-I ^	0.5 – 20.0 mg N/L	0.10	Waters	Kjeldahl digests; Copper catalyst	26-Aug-03
10-107-06-2-K ^	0.1 – 20.0 mg N/L	0.0093	Waters	Kjeldahl digests; low-flow method; Mercury catalyst	26-Aug-03
10-107-06-2-M #	0.25 – 25 mg N/L	0.05	Waters, wastewaters	Kjeldahl digests; Copper catalyst	29-Mar-06
10-107-06-2-N ^	0.5 – 20 mg N/L	0.02	Waters, wastewaters	Ultra-High Throughput method: >125 samples / hr.; Kjeldahl digests; Mercury catalyst; also covers 0.1 – 5.0 mg N/L; MDL of 0.04 mg N/L	14-Sep-07
10-107-06-2-P ^	0.25 – 25 mg N/L	0.056	Waters, wastewaters	Ultra-High Throughput method; Kjeldahl digests; Copper catalyst; DI water carrier	25-Apr-08
10-107-06-6-C ^	0.5 – 20 mg N/L	0.21	Waters, wastewaters	Kjeldahl digests; Inline distillation	24-Sep-08
13-107-06-1-A	1.0 – 25.0 mg N/L	0.1	Plant	Kjeldahl digests; 0.02 – 5.00% N; Selenium catalyst	15-Sep-03
13-107-06-2-D *	10 – 150 mg N/L	0.5	Soil, plant digests	Kjeldahl digests; Copper catalyst; 0.03 – 2.50% N in plants; 0.125 – 1.88% N in soil; 0.25 – 3.75% N in plant tissue; low-flow method	26-Oct-06
13-107-06-2-G *	1 – 50 mg N/L	0.12	Soil, plant digests	Kjeldahl digests; Selenium catalyst; 10% sulfuric acid digest	15-Sep-03
14-107-06-2-A	5.0 – 200 mg N/L	0.04	Dry fertilizer	Kjeldahl digests; Selenium catalyst	15-Sep-03
15-107-06-2-E	30 – 300 mg N/L	NA	Feeds & forages	Kjeldahl digests; Copper selenium oxide catalyst	15-Sep-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
15-107-06-2-F	7.5 – 300 mg N/L	0.75	Feeds & forages	Kjeldahl digests	15-Sep-03
15-107-06-4-A	5 – 300 mg N/L	0.8	Feeds & forages	Kjeldahl digests; Selenium catalyst	15-Sep-03
Gas Diffusion methods					
10-107-06-5-F	0.1 – 10.0 mg N/L	0.01	Waters, wastewaters	Gas diffusion; Kjeldahl digests; may be used for brackish sample matrix	26-Aug-03
Magnesium					
<i>See also IC section and Hardness</i>					
10-112-26-1-A	5 – 200 mg Mg/L	0.51	Waters, wastewaters	Xylidyl blue-I	27-Aug-03
12-112-26-1-A	5 – 200 mg Mg/L	1.26	Soil extracts	Morgans extract; Xylidyl blue-I	15-Sep-03
Manganese					
<i>See also IC section</i>					
10-131-35-1-A	0.005 – 0.30 mg Mn/L	0.0008	Waters	0.13% HNO ₃	15-Sep-03
10-131-35-1-B	0.2 – 10 mg Mn/L	0.005	Waters		15-Sep-03
10-131-35-1-D	12.5 – 250 µg Mn/L	5.0	Waters, wastewaters	0.5% HNO ₃	15-Sep-03
12-131-35-1-A	0.5 – 2.0 mg Mn/L	0.01	Soils	0.1 – 20 mg Mn/kg in soil; low-flow method	15-Sep-03
Molybdenum					
12-123-23-1-B	0.1 – 0.40 mg Mo/L	0.007	Soil extracts	Low-flow method	15-Sep-03
13-123-23-1-A	0.0625 – 0.25 mg Mo/L	0.0079	Plant tissue	Low-flow method	15-Sep-03
Monochloramine					
10-245-00-1-A	0.01 – 2.0 mg N/L as NH ₄ Cl	0.0028	Waters	Use w/ 10-107-06-1-L for free ammonia	05-Nov-07
Nitrate + Nitrite					
10-107-04-1-A # *	0.2 – 20.0 mg N/L	0.01	Waters	Cd reduction; low-flow method	28-Aug-00
10-107-04-1-B #	0.002 – 0.10 mg N/L	0.0003	Waters	Cd reduction	09-Oct-00
10-107-04-1-C #	0.01 – 2.0 mg N/L	0.002	Waters	Cd reduction	28-Aug-00
10-107-04-1-F ^	1 – 50.0 mg N/L	0.12	Waters	Cd reduction	01-Mar-01
10-107-04-1-H ^	5 – 80.0 mg N/L	0.027	Waters	Cd reduction (dialysis)	02-Mar-01
10-107-04-1-J #	0.10 – 10.0 mg N/L	0.012	Waters	Cd reduction; low-flow method	27-Mar-01
10-107-04-1-K #	0.5 – 5.0 µM N	0.059	Waters	Cd reduction; low-flow method	02-Mar-01

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
10-107-04-1-L #	0.02 – 2.0 mg N/L	0.002	Waters	Cd reduction; low-flow method	06-Mar-01
10-107-04-1-O #	0.05 – 10.0 mg N/L	0.007	Waters	Cd reduction	25-Aug-03
10-107-04-1-Q ^	5 – 800 µg N/L	0.49	Waters, wastewaters	Low-flow method; Imidazole buffer; for use w/ non- preserved and aced preserved samples; also covers range of 0.5 – 10 mg N/L; MDL 0.022 mg N/L in non-preserved samples; 0.017 mg N/L in acid preserved samples; under MUR, changes in buffer are allowed	11-Aug-03
10-107-04-1-R # *	0.025 – 20 mg N/L	0.0012	Waters, wastewaters	Ultra-High Throughput method: 120 samples / hr.; Low-range: 2 – 250 µg N/L; MDL 0.474 µg N/L	17-Aug-07
10-107-04-2-A # *	2 – 100 mg N/L	0.1	Waters	Hydrazine reduction	01-Aug-01
10-107-04-2-B #	0.05 – 1.0 mg N/L	0.002	Waters	Hydrazine reduction; AE support data	16-Mar-01
10-107-04-2-C	0.005 – 0.2 mg N/L	0.0018	Waters	Hydrazine reduction; AE support data	25-Aug-03
10-107-04-2-D #	0.05 – 7 mg N/L	0.006	Waters, wastewaters	Hydrazine reduction	14-Jan-02
10-107-04-5-A	0.2 – 20; 0.02 – 5.0 mg N/L	0.023; 0.009	Waters, wastewaters	Nitrate Reductase method for waters / wastewaters; reagents must be purchased from NECi ; dual range method	11-Feb-09
12-107-04-1-A	0.2 – 40.0 mg N/L	NA	Soil extracts	1 mM CaCl ₂ ; AE support data	15-Sep-03
12-107-04-1-B	0.025 – 20.0 mg N/L	0.005	Soil extracts	2 M KCl	21-Aug-03
12-107-04-1-C	0.2 – 20.0 mg N/L	NA	Soil extracts	Saturated (0.02 M) CaO; AE support data	15-Sep-03
12-107-04-1-E	0.05 – 5.0 mg N/L	NA	Soil extracts	Hydrazine reduction; AE support data	15-Sep-03
12-107-04-1-F	0.01 – 2.0 mg N/L	0.0013	Soil extracts	2 M KCl; AE support data	15-Sep-03
12-107-04-1-G	1.0 – 20.0 mg N/L	0.01	Soil extracts	0.0125 M CaCl ₂	15-Sep-03
12-107-04-1-H	0.05 – 10.0 mg N/L	0.011	Soil extracts	0.5 M K ₂ SO ₄	15-Sep-03
12-107-04-1-I	0.3 – 10 mg N/L	0.013	2 M KCl	Imidazole buffer	06-Dec-06
12-107-04-1-J	0.025 – 20 mg N/L	0.003	2 M KCl	Ultra-High Throughput method: 120 samples / hr.; 2 M KCl extracts of soil	22-Aug-07
12-107-04-5-A	0.2 – 20 mg N/L	0.028	2 M KCl	Nitrate reductase method for soil extracts; reagents must be purchased from NECi	02-Feb-09
13-107-04-1-A	0.2 – 20.0 mg N/L	NA	Plant	2% acetic acid extracts; AE support data	15-Sep-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
13-107-04-1-B	0.02 – 2.0 mg N/L	0.003	Plant	Water extract	15-Sep-03
14-107-04-1-A	1790 – 7140 mg N/kg as NO ₃ ⁻	NA	Liquid Fertilizers	Cd reduction; dialysis	15-Sep-03
14-107-04-1-B	30 – 300 mg N/L	0.38	Fertilizers	Cd reduction; dialysis; 0.75 – 7.5% N; 1 g sample	15-Sep-03
14-107-04-1-C	30 – 70.0 mg N/L	NA	Fertilizers	3.0 – 7.5% N; Cd reduction; dialysis	15-Sep-03
18-107-04-1-A	0.5 – 2.5 mg N/L	0.017	31% KOH	Cd reduction; AE support data	27-Nov-01
18-107-04-1-D	0.02 – 0.75 mg N/L	0.0030	Brine	2 – 20% NaCl w/v	10-Jan-02
19-107-04-1-A	2.0 – 100 µg N/L	0.4	Sulfuric acid	Cd reduction	15-Sep-03
19-107-04-1-B	0.0125 – 2.0 mg N/L	0.0013	Plating baths; mineral processing	Cd reduction; 34% ZnSO ₄	11-Sep-00
20-107-04-1-B	0.25 – 5 mg NO ₃ ⁻ /L	0.018	Dairy products	Uses dialysis to exclude fat and protein from the reduction	08-Oct-01
20-107-04-1-B	0.025 – 0.5 mg NO ₂ ⁻ /L	0.013	Dairy products	Uses dialysis to exclude fat and protein from the reduction	08-Oct-01
20-107-04-1-C	0.25 – 5.0 mg NO ₃ ⁻ /L	0.021	Dairy products	Also covers 0.025 – 1.0 mg NO ₂ ⁻ /L; both manifolds are included w/ method; requires 1 dialysis block	26-Mar-08
26-107-04-1-A	10 – 50.0 mg N/L	0.103	Tobacco extracts	0.005 M sulfuric acid	22-Jan-02
26-107-04-2-A	10 – 100 mg N/L	0.25	Tobacco extracts	0.05 M sulfuric acid	04-Dec-01
30-107-04-1-A ^	0.05 – 1.00 mg N/L	0.0029	Seawater	Omnion 3.0 support data	20-Nov-08
30-107-04-1-C ^	0.05 – 2.0 mg N/L	0.0029	Brackish waters	Uses 50% ASW as diluents and carrier; Omnion 3.0 support data; two ranges	21-Nov-08
31-107-04-1-A ^	1.25 – 5.0 µM N	0.03	Brackish, seawater	Cd reduction; 0.018 – 0.07 mg N/L	20-Aug-03
31-107-04-1-C ^	5.0 – 50.0 µM N	0.12	Brackish, seawater	Cd reduction; 0.07 – 0.7 mg N/L	16-Sep-03
31-107-04-1-D ^	0.5 – 14 µg N/L	0.2	Brackish, seawater	Cd reduction; 0.036 – 1.0 µM N	16-Sep-03
31-107-04-1-E ^	5 – 400 µg N/L	0.51	Brackish, seawater	0.36 – 28.6 µM N	19-Aug-03
31-107-04-1-F ^	0.5 – 14 µg N/L	0.08	Brackish, seawater	Requires 2 cm detector; QC8500 only	24-Sep-08
31-107-04-1-G ^	0.25 – 10 mg N/L	0.05	Brackish, seawater	Ultra-High Throughput method: 120 samples / hr.; low range: 0.01 – 1.0 mg N/L; MDL 0.002 mg N/L	25-Apr-08
31-107-04-1-H ^	0.25 – 30 mg N/L	0.025	Brackish, seawater	High range method; can also be used for non-saline matrices	28-Oct-08
31-107-04-5-A	0.02 – 5.0 mg N/L	0.009	Brackish, seawater	Nitrate reductase method for seawater; reagents must be purchased from NECi	11-Feb-09

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
60-107-04-1-A	0.1 – 5 µM N	0.05	Biological fluids	HEPES buffer; Cd reduction; low-flow method	16-Sep-03
Nitrite					
10-107-05-1-A # ^	0.01 – 10.0 mg N/L	0.005	Waters	Nitrite only; AE and 8000/8500 support: 8000/8500 range of 0.05 – 10 mg N/L; linear range of 0.05 – 5.0 mg N/L; MDL 0.004 mg N/L	11-Dec-00
10-107-05-1-B ^	0.014 – 0.07 mg N/L	0.0004	Waters	Nitrite only; 1.0 – 5 µM N; low-flow method	25-Aug-03
10-107-05-1-C ^	0.02 – 2.0 mg N/L	0.0016	Waters	Nitrite only; low-flow method	21-Aug-03
10-107-05-1-O ^	10 – 1000 µg N/L	4	Waters	Nitrite only; low-flow method	25-Aug-03
31-107-05-1-A ^	1.25 – 5.0 µM N	0.02	Brackish, seawaters	Nitrite only; 17.5 – 70 µg N/L	31-Jan-01
31-107-05-1-B ^	0.1 – 15 mg N/L	0.01	Brackish, seawaters	High range method	30-Oct-08
Nitrogen					
10-107-04-3-A *	200 – 2000 µg N/L	5.6	Waters	Inline total N; settleable particulate samples are not suitable w/ method	06-Aug-03
10-107-04-3-B *	0.5 – 30.0 mg N/L	0.1	Waters	Inline persulfate digestion; settleable particulate samples are not suitable w/ method	09-Apr-04
10-107-04-3-C	0.5 – 10.0 mg N/L	0.011	Waters	Inline persulfate digestion; AE support data; settleable particulate samples are not suitable w/ method	06-Aug-03
10-107-04-3-D	0.05 – 5.0 mg N/L	0.003	Waters, wastewaters	Imidazole buffer; Also covers range 0.2 – 20.0 mg N/L; MDL 0.008 mg N/L	28-Nov-07
10-107-04-3-E	0.05 – 10 mg N/L	0.005	Waters, wastewaters	Inline total N; requires high quality reagents and water to reach low end of range; settleable particulate samples are not suitable w/ method	05-Jan-09
10-107-04-3-P	0.2 – 10.0 mg N/L	0.05	Waters	Inline total N; settleable particulate samples are not suitable w/ method	08-Aug-03
10-107-04-4-A	0.5 – 10 mg N/L	0.02	Waters, wastewaters	Manual persulfate digest	25-Aug-03
10-107-04-4-B	0.02 – 5.0 mg N/L	0.006	Waters, wastewaters	Dual persulfate digest; Total Phosphorus can be measured from same digest (10-115-01-4-B); High range: 1 – 40 mg N/L; MDL 0.024 mg N/L	02-Jul-07

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
12-107-04-3-B	0.2 – 30.0 mg N/L	0.04	Soil extracts	Inline persulfate digestion; settleable particulate samples are not suitable w/ method	08-Aug-03
31-107-04-3-A	0.1 – 1.0 mg N/L	0.0049	Brackish, seawater	Inline digestion Total N; Cd reduction; 7.1 – 71 µM N; settleable particulate samples are not suitable w/ method	11-Aug-03
31-107-04-3-B	500 – 5000 µg N/L	78	Brackish, seawater	Inline persulfate digestion; Cd reduction; 35.7 – 357 µM N; settleable particulate samples are not suitable w/ method	11-Aug-03
31-107-04-4-B	0.02 – 5.0 mg N/L	0.0068	Brackish, seawater	Offline; Dual digestion for TN & TP; High range: 1 – 40 mg N/L; MDL 0.111 mg N/L	19-Jun-08
31-107-06-4-A	1 – 30 µg N/L	0.1	Brackish, seawater	Fluorescence method; uses OPA	23-Mar-07
pH					
10-304-24-2-E	3.0 – 12.0 pH units	NA	Waters	Sensorex electrode; Not for low-conductivity samples; AE support data	23-Sep-02
Phenol					
10-210-00-1-A #	5 – 200 µg phenol/L	0.6	Waters	Distilled samples	14-Dec-01
10-210-00-1-B #	0.05 – 2.0 mg phenol/L	0.0013	Waters	Distilled samples; cycle period: 30 s	18-Dec-00
10-210-00-1-X ^	0.005 – 0.2 mg phenol/L	0.0034	Waters	MicroDIST® method	27-Sep-01
10-210-00-1-Y ^	0.5 – 50 mg phenol/L	0.4	Waters	MicroDIST® method	17-Jul-01
10-210-00-3-A	2 – 200 µg phenol/L	0.28	Waters, wastewaters	Inline distillation for volatile phenolics; method includes dedicated channel; settleable particulate samples are not suitable w/ method	18-Aug-03
10-210-00-3-B	5 – 500 µg phenol/L	3.0	Waters, wastewaters	Inline distillation for volatile phenolics; also covers range: 10 – 1000 µg phenol/L; MDL 2.15 µg phenol/L ; method includes dedicated channel; settleable particulate samples are not suitable w/ method	24-Apr-06
10-210-00-3-C *^	2 – 200 µg phenol/L	0.61	Waters, wastewaters	Developed to allow automation of USEPA 420.4	16-Oct-08

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Phosphate, ortho					
Molybdate based methods					
10-115-01-1-A #	0.01 – 2.0 mg P/L	0.002	Waters, wastewaters		28-Aug-00
10-115-01-1-B #	0.01 – 0.20 mg P/L	0.0007	Waters		13-Sep-00
10-115-01-1-M #	1 – 100 µg P/L	0.1	Waters, wastewaters		27-Aug-03
10-115-01-1-O * ^	1.0 – 20 mg P/L	0.045	Waters, wastewaters	Omnion 3.0 support data; Ultra-High Throughput method: 120 samples / hr.; Equivalent to EPA method 365.1	27-Aug-03
10-115-01-1-P #	0.05 – 2.00 mg P/L	0.005	Waters	Low-flow method	27-Aug-03
10-115-01-1-Q #	0.010 – 0.20 mg P/L	0.0003	Waters	Low-flow method	27-Aug-03
10-115-01-1-T #	0.025 – 2.5 mg P/L	0.005	Waters		27-Aug-03
10-115-01-1-V # *	0.01 – 2.0 mg P/L	0.0012	Waters, wastewaters	Ultra-High Throughput method: >125 samples / hr.; High range: 0.2 – 20 mg P/L; MDL 0.0046 mg P/L	14-Sep-07
10-115-01-1-W * ^	0.25 – 20 µg P/L	0.046	Waters, wastewaters	Requires 2 cm detector; for samples w/ low silicate; QC8500 only	21-Jul-08
10-115-01-1-Y * ^	0.5 – 100 µg P/L	0.164	Waters, wastewaters	Requires 2 cm detector; for samples w/ higher silicate; QC8500 only	21-Jul-08
12-115-01-1-A	0.25 – 10.0 mg P/L	NA	Soil extracts	Mehlich III extracts	20-May-06
12-115-01-1-B	0.01 – 1.0 mg P/L	0.006	Soil extracts	0.5 M bicarbonate extracts	14-Nov-01
12-115-01-1-E	0.25 – 10.0 mg P/L	0.02	Soil extracts	0.5 M acetic acid; 0.5 M ammonium acetate	03-Dec-01
12-115-01-1-I	0.5 – 20.0 mg P/L	0.02	Soil extracts	Calcium acetate	11-Dec-01
12-115-01-1-J	1.25 – 50.0 mg P/L	0.125	Soil extracts	Calcium lactate	29-Jan-02
12-115-01-1-K	1.0 – 30.0 mg P/L	NA	Soil extracts	Morgans extract	30-Nov-01
12-115-01-1-L	0.05 – 6.0 mg P/L	0.01	Soil extracts	0.28 – 33.48 mg P/L in soil; Morgans extract	09-Jan-02
12-115-01-1-M	0.25 – 10 mg P/L	0.04	Soil extracts	Mehlich III extracts	11-May-06
12-115-01-1-N	0.4 – 20 mg P/L	0.07	Soil extracts	Ultra-High Throughput method: 120+ samples / hr.; Bray 1, Bray 2, Mehlich 1, or Mehlich III	04-Sep-07
18-115-01-1-B	0.25 – 10 mg P/L	0.01	0 – 10% NaCl		18-Jan-02
18-115-01-1-C	5 – 375 mg P/L	0.5	Aqueous formations	15.3 – 1147.5 mg PO ₄ ²⁻ /L	03-Apr-02
19-115-01-1-A	0.02 – 2.0 mg PO ₄ ²⁻ /L	0.01	Mineral processing	34% w/v zinc sulfate	10-Jan-02

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
31-115-01-1-G ^	2.0 – 10.0 µM P	0.02	Brackish, seawater	62 – 310 µg P/L as PO ₄ ³⁻	01-Aug-01
31-115-01-1-H ^	5 – 400 µg P/L	1.0	Brackish, seawater	0.16 – 12.91 µM P	20-Aug-03
31-115-01-1-I ^	1 – 100 µg P/L	0.25	Brackish, seawater	0.03 – 3.23 µM P	27-Jun-01
31-115-01-1-J ^	0.01 – 2.0 mg P/L	0.002	Brackish, seawater	Also covers range: 0.5 – 20 mg P/L as PO ₄ ³⁻ ; MDL 0.007 mg P/L as PO ₄ ³⁻	03-Dec-07
31-115-01-1-W ^	0.25 – 20 µg P/L	0.46	Brackish, seawater	Requires 2 cm detector; for samples w/ low silicate; QC8500 only	24-Sep-08
31-115-01-1-Y * ^	0.5 – 100 µg P/L	0.164	Brackish, seawater	Requires 2 cm detector; for samples w/ higher silicate; QC8500 only	21-Jul-08
31-115-01-4-B	0.04 – 1.0 0.05 mg P/L	0.0038	Brackish, seawater	Dual digest for TN & TP; High range: 0.25 – 10.0 mg P/L; MDL 0.0358 mg P/L; Low-flow method	19-Jun-08

Phosphorus

See also IC section

Molybdate based methods

10-115-01-1-C #	0.1 – 5.0 mg P/L	0.015	Waters	Total P; Kjeldahl digests; Mercury catalyst	15-May-01
10-115-01-1-D #	0.05 – 0.5 mg P/L	0.002	Waters	Total P; Kjeldahl digests; Mercury catalyst	26-Dec-00
10-115-01-1-E #	0.2 – 10.0 mg P/L	0.1	Waters	Total P; Persulfate digests	09-Oct-00
10-115-01-1-F #	0.003 – 0.2 mg P/L	0.0009	Waters	Total P; Persulfate digests	12-Dec-00
10-115-01-1-I ^	0.1 – 5.0 mg P/L	0.007	Waters, wastewaters	Ultra-High Throughput method: >100 samples / hr.; Total P; Kjeldahl digests; Mercury catalyst	28-Aug-07
10-115-01-2-B #	0.10 – 10 mg P/L	0.010	Waters, wastewaters	Total P; Kjeldahl digests; Copper catalyst	27-Mar-06
10-115-01-2-C	0.1 – 5.0 mg P/L	0.025	Waters, wastewaters	Ultra-High Throughput method: >120 samples / hr.; Total P; Kjeldahl digests; Copper catalyst	04-Apr-08
10-115-01-3-A ^	0.1 – 10.0 mg P/L	0.007	Waters	Total P; Inline acidic persulfate digest; settleable particulate samples are not suitable w/ method	09-Apr-04
10-115-01-3-B * ^	0.1 – 4.0 mg P/L	0.01	Waters	Total P; Inline acidic persulfate digest; settleable particulate samples are not suitable w/ method	11-Aug-03
10-115-01-3-C * ^	0.05 – 1.0 mg P/L	0.0011	Waters	Total P; Inline acidic persulfate digest; settleable particulate samples are not suitable w/ method	11-Aug-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
10-115-01-3-E ^	10 – 500 µg P/L	1.4	Waters, wastewaters	Total P; Inline acidic persulfate digest; settleable particulate samples are not suitable w/ method	11-Aug-03
10-115-01-3-F ^	2 – 100 µg P/L	0.42	Waters, wastewaters	Total P; Inline acidic persulfate digest; settleable particulate samples are not suitable w/ method	21-Nov-06
10-115-01-4-B	0.05 – 1.0 mg P/L	0.006	Waters, wastewaters	Dual digestion for TN & TP; Nitrogen method: 10-107-04- 4-B; High range: 0.25 – 10.0 mg P/L	02-Jul-07
10-115-01-4-I ^	0.2 – 20.0 mg P/L	NA	Waters, wastewaters	Total P; Persulfate manual digests; AE support data	27-Aug-03
10-115-01-4-J *	0.2 – 10 mg P/L	0.0033	Waters, wastewaters	Total P; Acidic persulfate digests; Ultra-High Throughput method: >125 samples / hr.	23-Aug-07
10-115-01-4-S ^	0.2 – 10 mg P/L	0.002	Waters, wastewaters	Total P; Potassium persulfate manual digest; low-flow method	27-Aug-03
10-115-01-4-U ^	0.01 – 0.2 mg P/L	0.0008	Waters	Total P; Persulfate manual digests; low-flow method	28-Aug-03
13-115-01-1-B *	1.0 – 50.0 mg P/L	0.08	Soil / Plant digests	Total P; Kjeldahl digests; Copper catalyst; 0.025 – 1.25% P in plant tissue; 0.013 – 0.625% P in soil	26-Oct-06
15-115-01-4-A	0.01 – 0.2 mg P/L	0.1	Feeds & forages	Total P; Selenium catalyst	15-Aug-01
18-115-01-3-B	12.5 – 375 mg P/L	NA	Aqueous formations	Inline persulfate digests	11-Aug-03
18-115-01-4-A	0.01 – 1.0 mg P/L	0.002	Organic oils	Nitric / Sulfuric manual digests	19-Jul-01
21-115-01-1-A	15 – 70 mg H ₃ PO ₄ /dL	0.05	Beverages	Phosphoric acid	13-Nov-01
30-115-01-4-A	0.01 – 0.50 mg P/L	NA	Brackish waters	Alkaline persulfate manual digests; 0.323 – 16.13 µM P/L	20-Jun-01
31-115-01-3-D ^	0.050 – 1.0 mg P/L	0.002	Brackish, freshwater	Total P; Inline acidic persulfate digests; 1.61 – 32.26 µM P/L	09-Apr-04
31-115-01-3-F ^	2 – 100 µg P/L	0.59	Brackish, seawater	Low level for Total P	14-Oct-08
31-115-01-4-A ^	12.5 – 400 µg P/L	1.66	Brackish, seawater	Acid persulfate manual digest; 0.4 – 12.9 µM P/L	14-Mar-01
Vandate based methods					
13-115-01-2-A	1.0 – 80 mg P/L	0.095	Plant digests	Total P; 0.05 – 2.0% P (w/w)	27-Nov-01
13-115-01-2-B	20 – 100 mg P/L	0.2	Plant tissue	Total P; 0.01 – 0.50% P in 1 g sample	29-Jan-02
14-115-01-2-A	10 – 180 mg P/L	0.2	Fertilizer (HCl digest)	Total P; 0.2 – 18% (w/w)	23-Oct-01

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
14-115-01-2-B	400 – 1600 mg P ₂ O ₅ /L	0.2	HCl digests	Total P; 10 – 40% P ₂ O ₅ (w/v); AOAC method for total phosphorus in fertilizers and phosphate rock	18-Apr-01
14-115-01-2-C	16.25 – 260 mg P ₂ O ₅ /L	0.47	HNO ₃ /HCl digests	Total P; Assoc. of Florida Phosphate Chemists method; HNO ₃ /HCl digests; Omnion 3.0 support data	17-Jul-08
14-115-01-2-E	72 – 180 mg P/L	0.02	Fertilizers	Total P; 7.20 – 18% P	29-Nov-01
14-115-01-2-F	1200 – 2400 mg P ₂ O ₅ /L	NA	Fertilizers	Total P; 30 – 60% P ₂ O ₅ (v/v); 6% HCl digest	29-Nov-01
14-115-01-2-G	30 – 65 % P ₂ O ₅	NA	P ₂ O ₅ in H ₃ PO ₄	Range is per 1 g sample diluted to 250 mL	11-Dec-01
15-115-01-2-C	2.5 – 100 mg P/L	0.35	Feeds & forages	Total P; Kjeldahl digests	29-Nov-01
15-115-01-3-A	5.0 – 400 mg P ₂ O ₅ /L	1.2	Feeds & forages	Ammonium Citrate extracts	28-Dec-01
15-115-01-3-B	20 – 800 mg P ₂ O ₅ /L	1	Fertilizer		28-Mar-05
20-115-01-2-B	100 – 1500 mg P/L as PO ₄	0.71	Food stuffs	Replaces 20-115-01-2-A	25-Apr-08

Potassium

See also IC section

10-119-03-1-A	2.0 – 100 mg K/L	0.33	Waters	Flame emission	09-Sep-03
12-119-03-1-A	0.20 – 10.0 mg K/L	0.01	Soil Extracts	Flame emission	15-Aug-01
12-119-03-1-B	1.0 – 50.0 mg K ₂ O/L	0.2	Soil Extracts	Flame emission; 0.83 – 41.5 mg K/L	11-Dec-01
12-119-03-1-C	1.0 – 20.0 mg K ₂ O/L	0.1	Soil Extracts	Flame emission; 0.83 – 16.6 mg K/L	29-Jan-02
12-119-03-1-D	5 – 200 mg K/L	0.126	Soil Extracts	Flame emission; Morgans extract	07-Nov-01
13-119-03-1-B	100 – 400 mg K/L	0.14	Ashed plant	Flame emission; 2% HNO ₃ ; 0.005 – 2.00% K; Dry basis	27-Nov-01
14-119-03-1-A	80 – 320 g K ₂ O/g	NA	Liquid fertilizers	Flame emission; 0.8 – 32% K ₂ O (w/w); 66,384 – 265,536 mg K/kg	19-Jul-01
14-119-03-1-B	5 – 250 mg K/L	0.4	Fertilizers, HCl digests	Flame emission; 0.2 – 25% K (v/v)	13-Jun-01
14-119-03-1-C	100 – 250 mg K/L	NA	Fertilizers	Flame emission; 10 – 25% (w/w)	03-Dec-01
14-119-03-1-D	20 – 450 mg K ₂ O/L	1.02	Fertilizers	K ₂ O in Ammonium Citrate or oxalate extracts of fertilizer; Lanthanum added to suppress phosphate effect	24-Sep-07

Pyruvate

21-230-00-1-A	10 – 100 mg pyruvate/L	0.8	Milk	Enzymatic / UV method	19-Nov-01
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USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Silicate					
10-114-27-1-A #	0.2 – 20 mg SiO ₂ /L	0.04	Waters	Molybdate reactive	08-Nov-01
10-114-27-1-B ^	10 – 100 µg SiO ₂ /L	0.58	Waters	Ultra-High Throughput method: 120 samples / hr.; Molybdate reactive; Omnion 3.0 support data	27-Aug-03
10-114-27-1-C ^	2.5 – 100 µg SiO ₂ /L	0.61	Waters, wastewaters	Requires 2 cm detector; QC8500 only	17-Feb-09
31-114-27-1-A ^	20 – 100 µM Si	0.2	Brackish, seawater	Molybdate reactive	05-Apr-01
31-114-27-1-B ^	1.25 – 5.0 µM Si	0.01	Brackish, seawater	Molybdate reactive; 0.035 – 0.14 mg Si/L	03-Apr-01
31-114-27-1-D ^	10 – 1700 µg Si/L	1.43	Brackish, seawater	0.36 – 60.52 µM Si	17-Jan-02
31-114-27-1-E ^	2.5 – 100 µg Si/L	0.606	Brackish, seawater	Requires 2 cm detector; QC8500 only	28-Feb-08
31-114-27-1-F ^	0.5 – 30 µg Si/L	0.05	Brackish, seawater	Ultra high range; salinity range: 0 – 35 ppt; can be used w/ non-saline samples	24-Oct-08
Sodium					
<i>See also IC section</i>					
10-111-32-1-A ^	5.0 – 300 mg Na/L	1.2	Waters	Flame emission	27-Aug-03
Sorbic Acid					
26-228-38-1-A	2.0 – 10.0 mg sorbic acid/L	0.18	Tobacco extract	Dialysis	19-Nov-01
Sugars					
26-201-00-1-B	10 – 500 mg glucose/L	NA	Tobacco	Ferricyanide; water extracts; Omnion 3.0 support data	19-Nov-08
Sulfate					
<i>See also IC section</i>					
Methylthymol Blue (MTB) methods					
10-116-10-2-A #	5.0 – 100 mg SO ₄ ²⁻ /L	1.8	Waters	Methyl Thymol Blue	29-Aug-03
10-116-10-2-B #	50 – 300 mg SO ₄ ²⁻ /L	7.2	Waters	Methyl Thymol Blue	29-Aug-03
10-116-10-2-E ^	2 – 40 mg SO ₄ ²⁻ /L	0.36	Waters, wastewaters	Replaces 10-116-10-2-C	25-Apr-08
Turbidimetric Methods					
10-116-10-1-A ^	3.0 – 300 mg SO ₄ ²⁻ /L	0.95	Waters	Turbidimetric	28-Aug-03
10-116-10-1-C ^	0.5 – 10.0 mg SO ₄ ²⁻ /L	0.2	Waters	Turbidimetric	28-Aug-03
10-116-10-1-E ^	10 – 100 mg SO ₄ ²⁻ /L	0.6	Waters	Turbidimetric	29-Aug-03
10-116-10-1-G ^	50 – 2000 mg SO ₄ ²⁻ /L	NA	Waters	Turbidimetric; low-flow method	29-Aug-03

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
12-116-10-1-D	1 – 20 mg S/L	0.67	Soil extracts	Turbidimetric; 3 – 60 mg SO ₄ ²⁻ /L; 8 M monobasic calcium phosphate	16-Sep-03
14-116-10-1-A	10 – 360 mg SO ₄ ²⁻ /L	NA	Fertilizer (HCl digest)	Turbidimetric; 0.33 – 12% w/w SO ₄ ²⁻ in solid fertilizer	16-Sep-03
Sulfide					
10-116-29-1-A ^	0.02 – 2.0 mg S/L	0.005	Waters	MicroDIST® method; Methylene Blue; 0.25 M NaOH	29-Aug-03
10-116-29-1-C ^	25 – 100 mg S/L	0.58	Waters	0.25 M NaOH; distillation required	29-Aug-03
10-116-29-3-A ^	0.01 – 2.0 mg S/L	0.006	Waters, wastewaters	Inline distillation; method includes two dedicated channels; settleable particulate samples are not suitable w/ method	03-Jul-01
10-116-29-3-B ^	1.0 – 10.0 mg S/L	0.2	Waters, wastewaters	Inline distillation; method includes two dedicated channels; settleable particulate samples are not suitable w/ method	18-Aug-03
12-116-29-3-A	0.01 – 2.0 mg S ²⁻ /L	0.008	Soil extracts	For 1 M NaOH extracts of soils only	25-Aug-08
Sulfite					
10-116-11-1-A	0.25 – 2.0 mg SO ₃ ²⁻ /L	0.03	Waters	Pararosaniline; not for TCM preserved samples	04-Apr-08
21-116-11-2-D	0.5 – 30 mg SO ₃ ²⁻ /L	0.25	Wines	Total SO ₃ ²⁻	06-Dec-01
Sulfur Dioxide					
24-116-42-1-A	0.08 – 2.4 mg SO ₂ /L	0.008	Air sampling filter extracts	Air sampling extracts in 0.04 M potassium tetrachloro- mercurate (TCM)	05-Mar-02
Surfactants					
10-306-00-1-C ^	0.010 – 1.0 mg/L	0.0029	Waters, wastewaters	Dual extraction; LAS range: 0.025 – 1.0 mg/L; MDL 0.0078 mg/L	09-Feb-04
10-306-00-1-D ^	0.010 – 1.0 mg SDS/L	0.0024	Waters, wastewaters	Single extraction method	09-Feb-04
10-306-00-1-E	0.2 – 20.0 mg SDS/L	0.05	Waters, wastewaters	For SDS only; dual extraction	05-Oct-05
Thiocyanate					
10-229-00-1-A	0.1 – 2.0 mg SCN ⁻ /L	0.02	Waters		16-Sep-03
12-229-00-1-A	0.05 – 2.0 mg SCN ⁻ /L	0.008	Soil extracts	1 M NaOH extracts in soils	02-Sep-08

USEPA Accepted Methods

^ USEPA Equivalent Methods

* Methods with External Quality Standards

Method No	Range	MDL	Matrix	Comments	Rev Date
Total Amino Acids					
18-218-00-1-A	1.25 – 40 mM Leucine	0.22	Aqueous formulations		02-Sep-03
Urea					
10-206-00-1-A	0.1 – 20 mg N/L	0.007	Waters, wastewaters	High range method; can not be run simultaneously w/ other methods as uses 0.84 M NaCl wash solution	25-Apr-08
10-206-00-1-B	15 – 500 µg N/L	3.3	Fresh and surface waters	Low range method	25-Apr-08
14-206-00-2-A	75 – 600 mg N/L	1.0	Fertilizer digests	Urease enzymatic method	16-Sep-03
14-206-00-3-B	4.5 – 18% N (w/w)	NA	Liquid fertilizers	DMAB	16-Sep-03
14-206-00-3-C	60 – 600 mg N/L	0.97	Fertilizers	DMAB; 1.5 – 15% N (w/w)	16-Sep-03
14-206-00-3-D	60 – 150 mg N/L	0.07	Fertilizers	DMAB; 6.0 – 15% N (w/w)	16-Sep-03
31-206-00-1-A	10 – 400 µg N/L	2.9	Brackish, seawater	0.71 – 28.57 µM N	01-Aug-01
31-206-00-1-B	0.2 – 20 ng N/L	0.026	Brackish, seawater	Also covers range: 25 – 5000 µg N/L	07-Dec-07
Zinc					
<i>See also IC section</i>					
10-130-18-2-A	0.1 – 5 mg Zn/L	0.007	Waters	Zincon	16-Sep-03
12-130-18-2-A	1.25 – 5.0 mg Zn/L	0.004	Soil extracts	Zincon; low-flow method	27-Nov-01

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* Methods with External Quality Standards

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