Water and Wastewater Methods List for Automated Ion Analyzers

Flow Injection Analysis

09 Oct 2020

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 symbols after the method number depending on whether the method is Accepted or Equivalent for NPDES and/or NPDWR reporting. Additional regulatory information can be found in the Regulatory Quick Reference section.
- Find methods with ERA or other external QC included in the 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 **actual, calibrated range.** The calibrated range is the lowest calibration standard to the highest calibration standard. (A blank is typically included in the calibration but is not included in the method range)

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•**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 X 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. Typically, this is the lowest calibration standard in a given method.

•**Precision**: Stated in the methods as %RSD. %RSD is calculated as follows: %RSD = (SD /Mean) x 100

Part Numbers Versus Method Numbers

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

Table of Contents

•Methods, other than those listed as EPA Accepted/equivalent, 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	70	High Purity Waters

Analyte:

The first three numbers indicate the predominant chemical moiety.

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
129	Copper	131	Manganese
135	Bromine	136	Iodine
140	Carbon		

Molecules

201	Reducing sugars (Total)	203	Glucose
204	Cyanide	206	Urea
210	Phenol	218	Total amino acids
221	Formaldehyde	224	Chlorate
225	Hydroxide	226	Hypochlorite
241	Sulfur dioxide	244	Amylose
245	Monochloramine	246	Reducing Substances

Parameters

301	Hardness (Total)	302	Conductivity
303	Alkalinity	304	pH
305	Acidity	306	Surfactants
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)
18	Total Iron (Fe^{2+} + Fe^{3+})	19	Iron (II) (Fe^{2+})
21	Bromide (Br^-)	23	Molybdenum (VI) (Mo)
24	Hydronium (H_3O^+, H^+)	25	Hydroxide (OH^-)
26	Magnesium (Mg^{2+})	27	Silicate (SiO_2)
29	Sulfide (S^{2-})	31	Calcium carbonate ($CaCO_3$)
32	Sodium cation (Na^+)	33	Aluminum (inorganic) (Al)
34	Aluminum (organic) (Al)	35	Chlorate (ClO_3^-)
36	Hypochlorite (OCl^-)	40	Perchlorate
42	Sulfur dioxide		

Chemistry:

Some analytes have more than one chemistry.

Example:		
Ammonia	**10-107-06-**1	phenolate, phenate
	10-107-06-2	salicylate
	10-107-06-5	gas diffusion

Concentration:

Each range of concentrations for an analyte is given by a single letter. See the methods list for the ranges. Some methods cover more than one range.

Heaters:

Standard heater: Standard heaters have a 175 cm section of 0.032" i.d. (0.8mm) and a 650 cm section of 0.032" i.d. tubing

Non-standard heater: Has a different type and/or length of tubing than that listed above. (Controller and heater block are the same; only the tubing is different).

Regulatory Quick Reference

The QuikChem® methods in the list that follows are considered permitted reporting options for the National Pollutant Discharge Elimination (NPDES) and/or the National Primary Drinking Water Regulations (NPDWR) programs of the US Environmental Protection Agency (USEPA). Also listed are those QuikChem® methods that follow ISO standards.

The most recent MUR (Method Update Rule) was signed by the Administrator on April 17, 2012 and published at the CFR on May 18, 2012.

Standard Methods (Which are Lachat Methods) added to Table 1B:

Analyte	Lachat #*	SM #
Ammonia	10-107-06-1-J	4500-NH_3-H
Organic Nitrogen (Kjeldahl Nitrogen)	10-107-06-2-D 10-107-06-2-E	4500 N_{ORG} D-1997
Orthophosphorus	10-115-01-1-A	4500 P G 1999
Total phosphorus (manual digest)	10-115-01-1-E	4500 P H 1999
Silica	10-114-27-1-A	4500 SiO_2 F-1997
Sulfate	10-116-10-2-A	4500 SO_4 G-1997

(Please note that these methods, except for MTB sulfate, already had acceptable version letters for NPDES Reporting).

Although information regarding approved and accepted methods is published in the CFR, states still have primacy. As a result, it is important that labs discuss their plans to use **any** method (including promulgated, accepted, equivalent/modified methods) with their auditor **prior** to the method's implementation, to be sure the proposed change or modified method will be accepted. By doing so, the lab will also know in advance what validation will be required in their specific case for implementation.

Method Number	USEPA NPDES	USEPA NPDWR	USEPA Method	ISO
Alkalinity				
10-303-31-1-A	Accepted			
10-303-31-1-D	Equivalent		310.2	
Chloride				
10-117-07-1-A	Accepted	Accepted		15682
10-117-07-1-B	Accepted	Accepted		15682
10-117-07-1-C	Equivalent		USGS I2 187-85	
10-117-07-1-H	Accepted			
10-117-07-1-K	Equivalent		USGS I2 187-85	
Chromium				
10-124-13-1-A	Accepted			
10-124-13-1-B	Equivalent		SM (20^{th}) 3500 Cr-B USGS I-2030-85 ASTM D1687-92, 02	

Method Number	USEPA NPDES	USEPA NPDWR	USEPA Method	ISO
Conductivity				
10-302-00-1-A	Accepted			
10-302-00-1-B	Accepted			
Cyanide				
10-204-00-1-A	Accepted	Accepted		
10-204-00-1-X	Approved	Approved	Promulgated method	
10-204-00-1-X2	Equivalent	Accepted	10-204-00-1-X	
Fluoride				
10-109-12-2-A	Accepted	Accepted		
Hardness				
10-301-31-1-A	Accepted			
Nitrogen – Ammonia				
10-107-06-1-B	Accepted			
10-107-06-1-C	Accepted			
10-107-06-1-F	Equivalent		350.1	
10-107-06-1-G	Equivalent		350.1	
10-107-06-1-I	Accepted	Accepted		
10-107-06-1-J	Accepted	Accepted		
10-107-06-1-K	Accepted			
10-107-06-1-M	Equivalent		350.1	
10-107-06-1-X[1]	Equivalent		350.1	
10-107-06-2-A[2]	Equivalent		350.1	
10-107-06-2-L[2]	Equivalent		350.1	
10-107-06-2-O[2]	Equivalent		350.1	
10-107-06-2-X	Equivalent		350.1	
10-107-06-3-F	Equivalent		350.1	
10-107-06-5-B				11732
10-107-06-5-J[1,2]	Equivalent		350.1	
10-107-06-6-A[1,2]	Equivalent		350.1	
10-107-06-6-B[1]	Equivalent		350.1	
30-107-06-1-A	Accepted			
31-107-06-1-B	Equivalent		350.1	
31-107-06-1-F	Equivalent		350.1	
31-107-06-1-G	Equivalent		350.1	
31-107-06-1-H	Equivalent		350.1	
Nitrogen – Kjeldahl (TKN)				
10-107-06-2-D	Accepted			
10-107-06-2-E	Accepted			
10-107-06-2-H	Equivalent		351.2	
10-107-06-2-I	Equivalent		351.2	
10-107-06-2-K	Equivalent		351.2	
10-107-06-2-M	Equivalent		351.2	

Method Number	USEPA NPDES	USEPA NPDWR	USEPA Method	ISO
10-107-06-2-N	Equivalent		351.2	
10-107-06-2-P	Equivalent		351.2	
10-107-06-2-Q	Equivalent		351.2	
10-107-06-5-F	Equivalent		PAI DK03	11732
10-107-06-6-D[1]	Equivalent		351.2	
Nitrogen – Nitrate + Nitrite				
10-107-04-1-A	Accepted	Accepted		
10-107-04-1-B	Accepted	Accepted		
10-107-04-1-C	Accepted	Accepted		
10-107-04-1-F	Equivalent		353.2	
10-107-04-1-H	Equivalent		353.2	
10-107-04-1-J	Accepted	Accepted		
10-107-04-1-K	Accepted	Accepted		
10-107-04-1-L	Accepted	Accepted		
10-107-04-1-O	Accepted	Accepted		
10-107-04-1-Q	Equivalent		353.2	
10-107-04-1-R	Equivalent	Accepted	353.2	
10-107-04-2-A	Accepted	Accepted		
30-107-04-1-A	Accepted			
30-107-04-1-C	Equivalent		353.2	
31-107-04-1-A	Equivalent		353.4	
31-107-04-1-C	Equivalent		353.4	
31-107-04-1-D	Equivalent		353.4	
31-107-04-1-E	Equivalent		353.4	
31-107-04-1-F	Equivalent		353.4	
31-107-04-1-G	Equivalent		353.4	
31-107-04-1-H	Equivalent		353.4	
Nitrogen – Nitrite				
10-107-05-1-A	Equivalent	Accepted	353.2	
10-107-05-1-B	Equivalent		353.2	
10-107-05-1-C	Equivalent		353.2	
31-107-05-1-A	Equivalent		353.4	
31-107-05-1-B	Equivalent		353.4	
Phenol				
10-210-00-1-A	Accepted			
10-210-00-1-B	Accepted			
10-210-00-1-F	Equivalent		420.1	
10-210-00-1-X[1]	Equivalent		420.1	
10-210-00-3-C[1]	Equivalent		420.4	

Method Number	USEPA NPDES	USEPA NPDWR	USEPA Method	ISO
Phosphate, Ortho				
10-115-01-1-A	Accepted	Accepted		
10-115-01-1-B	Accepted	Accepted		
10-115-01-1-M	Accepted	Accepted		
10-115-01-1-O	Equivalent		365.1	
10-115-01-1-P	Accepted	Accepted		
10-115-01-1-Q	Accepted	Accepted		
10-115-01-1-V	Equivalent	Accepted	365.1	
10-115-01-1-W	Equivalent		365.1	
10-115-01-1-Y	Equivalent		365.1	
31-115-01-1-G	Equivalent		365.5	
31-115-01-1-H	Equivalent		365.5	
31-115-01-1-I	Equivalent		365.5	
31-115-01-1-J	Equivalent		365.5	
31-115-01-1-W	Equivalent		365.5	
31-115-01-1-Y	Equivalent		365.5	
80-115-01-1-A	Equivalent	Accepted	365.1	
Phosphate, Total				
10-115-01-1-E	Accepted			
10-115-01-1-F	Accepted			
10-115-01-2-B	Equivalent		365.4	
10-115-01-3-A	Equivalent		365.3	
10-115-01-3-B	Equivalent		365.3	
10-115-01-3-C	Equivalent		365.3	
10-115-01-3-E	Equivalent		365.3	
10-115-01-3-F	Equivalent		365.3	
10-115-01-4-I	Equivalent		365.3	
Phosphate, Total Kjeldahl (TKP)				
10-115-01-1-C	Accepted			
10-115-01-1-D	Accepted			
10-115-01-1-I	Equivalent		365.4	
10-115-01-2-B	Equivalent		365.4	
10-115-01-2-C	Equivalent		365.4	
Silicate				
10-114-27-1-A	Accepted			
10-114-27-1-B	Equivalent		SM(20th)4500-SiO2C USGS I-2700-85 ASTM D859-94, 00	
10-114-27-1-C	Equivalent		SM(20th)4500-SiO2C USGS I-2700-85 ASTM D859-94, 00	
31-114-27-1-A	Equivalent		366.0	
31-114-27-1-B	Equivalent		366.0	
31-114-27-1-D	Equivalent		366.0	
31-114-27-1-E	Equivalent		366.0	

Method Number	USEPA NPDES	USEPA NPDWR	USEPA Method	ISO
31-114-27-1-F	Equivalent		366.0	
Sulfate				
10-116-01-3-A	Equivalent		ASTM D516-02	
10-116-10-2-A	Equivalent		375.2	
10-116-10-2-B	Equivalent		375.2	
10-116-10-2-E	Equivalent		375.2	
10-116-10-2-F	Equivalent		375.2	
Sulfide				
10-116-29-1-A	Equivalent		SM(20th) 4500-S-D	
10-116-29-1-B	Equivalent		SM(20th) 4500-S-D	
Anionic Surfactants (MBAS)				
10-306-00-1-D	Equivalent		SM(20th) 5540-C	
10-306-00-1-F	Equivalent		ASTM 2330-02/SM5440 C.	

[1] EPA has revised the language at (b)(4)(T) be **more specific with respect to the use of gas diffusion across a hydrophobic semi-permeable membrane,** to separate the analyte of interest from the sample matrix in place of manual or automated distillation for the analysis of certain analytes. This is an acceptable change to an approved method for the following analytes: ammonia, cyanide, TKN, and Total Phenolics.

[2]Betholot-based method, uses salicylate. See Table 1B at 40 CFR 136

Comparison tables are available for all methods that are equivalent to NPDES methods

In the list of methods that follows:

Designation in the methods list means the method is EPA accepted as equivalent for NPDWR, NPDES, or both (Check the table above)

^ Designation in the methods list means the method is equivalent for NPDES reporting under the MUR

[R] **Designation means the manifold is compliant with RoHS-2**. (Verify with your sales person that the method can be sold into the EU).

Flow Injection Analysis

Acidity

10-305-31-1-A^{R}	30 – 500	4.0	mg $CaCO_3$/L	Waters	Thymol blue method. 600 nm	3-Sep-03

Alkalinity

10-303-31-1-A^{R}#	10 – 500	2.3	mg $CaCO_3$/L	Waters	Methyl orange method; Total Alkalinity. 550 nm, NPDES Accepted.	23-Jan-01
10-303-31-1-D^{R}^	1 – 50	0.27	mg $CaCO_3$/L	Waters	Methyl orange method; Total Alkalinity, 550 nm. NPDES Equivalent (310.2).	3-Sep-03

Aluminum

10-113-33-1-B^{R}	0.1 – 5.0	0.02	mg Al/L	Waters	Total Reactive (monomeric) Al; pyrocatechol violet; determination in 0.15% HNO_3 matrix. 580 nm. **Inert Probe required**	27-Aug-03
10-113-34-1-B	0.01 – 0.3	0.0015	mg Al/L	Waters	Non-exchangeable (organically complexed) Al. pyrocatechol violet; Dilute HNO_3 preservation required. 580 nm. **Inert Probe required**	27-Aug-03

Ammonia

10-107-06-1-B #*	0.05 – 5.0	0.007	mg N/L as NH_3	Waters	Alkaline phenol-based method; determination in 0.2% H_2SO_4 preserved samples; 630 nm**. Requires a standard heater**. NPDES Accepted	27-Aug-01
10-107-06-1-C #^{R}	0.01 – 4.0	0.004	mg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm. determination in non-preserved samples; **Requires a standard heater** NPDES Accepted	2-Nov-01
10-107-06-1-F^{R}^	10–100	1.0	µg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm **Requires a standard heater** Preserved samples. NPDES Equivalent (350.1)	
10-107-06-1-G ^{R}^	10 – 500	1.53	µg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm. Preserved samples. Ultra High Throughput method (>100 samples/hr); **Requires a standard heater.** NPDES Equivalent (350.1)	14-Dec-07

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-107-06-1-I [R]^	0.1 – 30.0	0.01	mg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm. Non-preserved samples. Preserved samples require pH adjustment prior to analysis. **Requires a standard heater** NPDES Equivalent	28 Aug 15
10-107-06-1-J #	0.01 – 2.0	0.002	mg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm. Low-flow method; determination in preserved and non-preserved samples; **Requires a standard heater** NPDES/NPDWR Accepted	29-Nov-07
10-107-06-1-K[R]#	0.2 – 20.0	0.01	mg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm. **Requires a standard heater**. Low-flow method; NPDES Accepted	15-Mar-01
10-107-06-1-L	0.01 – 2.0	0.0028	mg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm. Use w/ 10-245-00-1-A for monochloramine Non-preserved samples. **Requires a standard heater**	6-Nov-07
10-107-06-1-M^	0.01 – 2.0 0.2 – 20.0	0.002 0.011	mg N/L as NH_3	Waters	Alkaline phenol-based method; determination in acid preserved or non-acid preserved samples; multi-range method; 630 nm. **Requires a standard heater** NPDES Equivalent (350.1)	9-Nov-07
10-107-06-1-O [R]^	2.0 – 500 0.25 – 10	0.56	µg N/L as NH_3 mg N/L as NH_3	Waters	Alkaline phenol-based method; multi-range method; 630 nm. Preserved samples. **Requires a standard heater** NPDES Equivalent (350.1)	22-Feb-08
10-107-06-1-Q^	0.005- 2.0 0.25-20.0	0.0022 0.0038	mg N/L as NH_3	Waters	Alkaline phenol-based method, citrate buffer; multi-range method; 630 nm. Non-preserved samples. **Requires a standard heater** NPDES Equivalent (349.0)	17-Aug-10
10-107-06-1-X [R]^	0.05 – 20.0	0.007	mg N/L as NH_3	Waters	**MicroDist method**; **requires MicroDist block and tubes**. Preserved or un-preserved samples. Alkaline phenol determination. 630 nm. **Requires a standard heater** NPDES Equivalent (350.1)	17-Sep-09
10-107-06-2-A[R] ^	0.10 – 5.0 1.0-20	0.005 0.10	mg N/L as NH_3	Waters	Sodium salicylate-based method; 660 nm. **Requires a standard heater** NPDES Equivalent (350.1)	15-Sept-15
10-107-06-2-L[R] * ^	0.05 – 20	0.01	mg N/L as NH_3	Waters	Sodium salicylate-based method; 660 nm Ultra High Throughput method (>120 samples/hr); **Requires a standard heater** NPDES Equivalent (350.1)	16-Aug-07
10-107-06-2-O[R] ^	10 – 500	1.1	µg N/L as NH_3	Waters	Sodium salicylate-based method; 660 nm. **Requires a standard heater** multi-range	7-Dec-07

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-107-06-2-R[R]	0.25 – 30	0.011	mg N as NH_3		method; NPDES Equivalent (350.1)	
	0.02-5.0	0.004	mg N as NH_3	Waters	10 mM H_3PO_4 preservation. Sodium salicylate-based method; 660 nm. **Requires a standard heater**	18-Dec-09
10-107-06-2-X[R]^	0.05-20	0.033	mg N/L as NH_3	Waters	Sodium Salicylate method for MicroDist distillates. **Requires a standard heater**. Preserved or un-preserved samples. 660 nm. Requires MicroDist block and tubes. NPDES Equivalent (350.1)	17-Aug -15
10-107-06-3-B[R]	0.05 – 1.0	0.008	mg N/L as NH_3	Waters	Sodium salicylate-based method; Uses DClC instead of NaOCl 660 nm. **Requires a standard heater.**	26-Aug-03
10-107-06-3-D[R]	0.005 – 0.25	0.001	mg N/L as NH_3	Waters	Sodium salicylate-based method; uses DClC instead of NaOCl 660 nm. **Requires a standard heater**	26-Aug-03
10-107-06-3-F [R]^	1.25 – 100	0.41	µg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm. **Requires a non-standard heater** uses DClC; **2-cm detector** method; for **QC8500 only**; NPDES Equivalent (350.1)	17-Feb-09
10-107-06-5-B[R]	0.10 – 1.0 1.0-10.0	0.01	mg N/L as NH_3	Waters	Gas diffusion method; low-flow method; ISO (11732) 590nm	19-Mar-04
10-107-06-5-J[R]^	0.01-1.0 0.1-20	0.002 0.02	mg N/Las NH_3	Waters	Gas Diffusion method. Salicylate/DCIC. May be used for TKN as well as brackish/saline samples. 660 nm. **Requires a standard heater**.	16-Jan-15
10-107-06-6-A[R] ^	0.25 – 20	0.13	mg N/L as NH_3	Waters	Sodium salicylate-based method; 660 nm. inline distillation method; **Requires a standard heater and in-line module for distillation step.** Samples w/ particulates not suitable. NPDES Equivalent (350.1);	24-Jul-08
10-107-06-6-B [R]^	0.25 – 10	0.066	mg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm. inline distillation method; low-flow method; **Requires a standard heater and an in-line module for the distillation.** Samples w/ particulates not suitable. NPDES Equivalent (350.1);	29-Jul-08
10-107-06-6-E[R]^	10-250	5 (pres.) 1 (un-pres.)	µg N/L as NH_3	Waters	Alkaline phenol-based method; 630 nm inline distillation method; **Requires a standard heater and an in-line module for the distillation.** Low-flow method; samples w/ particulates not suitable NPDES Equivalent (350.1);	15-Apr-11

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
Boron						
10-105-08-1-B^{R}	0.5 – 10.0	0.02	mg B/L	Waters	Azomethine-H method. 430 nm	22-Aug-03
Bromide						
10-135-21-2-B^{R}	0.5 – 10	0.075	mg Br^-/L	Waters	Phenol red method. 590 nm.	3-Sep-03
Carbonate (Total)						
10-216-00-1-B^{R}	1-50	0.02	mM CO2/L	Waters	Cresol red gas diffusion method. 450 nm	15-May-1
Chloride						
10-117-07-1-A# *	6 – 300	0.15	mg Cl^-/L	Waters	Mercuric thiocyanate, 480 nm. Low-flow method; NPDES/NPDWR Accepted; also follows ISO (15682)	29-Nov-07
10-117-07-1-B #	2.5 – 100	0.5	mg Cl^-/L	Waters	Mercuric thiocyanate, 480 nm. Low-flow method; NPDES/NPDWR Accepted; also follows ISO (15682)	29-Nov-07
10-117-07-1-C^	0.1 – 10.0	0.017	mg Cl^-/L	Waters	Mercuric thiocyanate, 480 nm. Low-flow method; NPDES Equivalent. follows Standard Methods (4500-Cl-G; USGS I2187-85);	28-Aug-03
10-117-07-1-H#	2.5 – 100	0.2	mg Cl^-/L	Waters	Mercuric thiocyanate, 480 follows Standard Methods (4500-Cl-G; USGS I2187-85); 480nm. also follows ISO (15682) Low-flow method; NPDES Accepted	5-Apr-01
10-117-07-1-K^{R}^	1.0 – 150	0.277	mg Cl^-/L	Waters	Mercuric thiocyanate, 480 nm .Ultra High Throughput method (120 samples/hr); NPDES Equivalent; follows Standard Methods (4500-Cl-G); USGS I2187-85); also follows ISO (15682)	27-May-09

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
Chromium						
10-124-13-1-A^{R}#	5 – 400	0.35	µg Cr/L as Cr(VI)	Waters	Hexavalent chromium; Diphenylcarbazide; 540 nm. Has Omnion 3.0 support added. NPDES Accepted.	9-Oct-00
10-124-13-1-B^{R}^	2 – 200	0.27	µg Cr/L as Cr(VI)	Waters	Hexavalent chromium; Diphenylcarbazide; 540 nm NPDES Equivalent; follows Standard Methods (3500 Cr-B) Diphenylcarbazide;	4-Apr-04
Color						
10-308-00-1-B^{R}	25 – 250	0.49	Pt-Co Color Units	Waters	450 nm	2-Dec-08
10-308-00-1-C^{R}	2.5- 100	0.6	Pt-Co Color Units	Waters	450 nm	4-Nov-10
Conductivity						
10-302-00-1-A 10-302-00-A52^{R}	5.94-575	0.5	µS/cm	Waters	QC8000 ONLY Dedicated channel required. QC8500 S2 method only.	29 Nov-07
Copper						
10-129-17-1-A^{R}	0.02 – 3.0	0.003	mg Cu/L	Waters	Bathocuprine method; 480 nm.	26-Sep-08
Cyanide						
10-204-00-1-A#	0.005 – 0.5	0.0005	mg CN^-/L	Waters	**Total Cyanide** Macro distillation method; 0.25 M NaOH matrix following distillation; Pyridine/barbituric acid, 570 nm. NPDES / NPDWR Accepted; follows Standard Methods (4500-CN). . **Requires a standard heater.**	29-Nov-07
10-204-00-1-D^{R}	0.20 – 10.0	0.003	mg CN^-/L	Waters	**Total Cyanide** Acetate buffer; 0.25 M NaOH matrix following distillation. Pyridine/ barbituric acid, 570 nm. **Requires a standard heater.**	18-Sep-03
10-204-00-1-G^{R}	2.0 – 500	0.5	µg CN^-/L	Waters	Macro distillation method; 0.25 M NaOH matrix following distillation; pyridine-free reagents (isonicotinic/barbituric acid). 600 nm. **Standard heater required.**	16-Sep-03

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-204-00-1-H	0.002 – 0.01 0.1 – 5.0	0.00047 0.0138	mg CN^-/L	Waters	**Free Cyanide**; isonicotinic/barbituric acid. 600 nm. pyridine-free reagents; can be used w/ 10-204-00-2-G for inline total CN; multi-range method; **Requires a standard heater.**	7-Jun-06
10-204-00-1-J	25-1000	1.4	µg CN-/L		Total or WAD CN; Off-line Distillation. Pyridine/pyrazolone method. JIS K0102	31-Oct -14
10-204-00-1-X#	0.005 – 0.50	0.001	mg CN^-/L	Waters	**Total Cyanide**; MicroDIST® method; 0.25 M NaOH matrix following distillation; Pyridine/barbituric acid, 570 nm. NPDES/NPDWR approved method **Requires a standard heater.**	29-Nov-07
10-204-00-1-X2#^	0.002 – 0.5	0.00038	mg CN^-/L	Waters	**Total Cyanide**; MicroDIST® method; 0.25 M NaOH matrix following distillation; Pyridine/barbituric acid, 570 nm. Ultra-High Throughput method (>125 samples/hr); NPDES Equivalent / NPDWR Accepted **Requires a standard heater.**	16-Apr-08
10-204-00-2-C	2 – 100	0.21	µg CN^-/L	Waters	**Total Cyanide**; inline method; low-flow method; NPDES Equivalent; Pyridine/barbituric acid, 570 nm**.** Samples w/ particulates not suitable **Inline module and Standard heater required.**	14-Sep-07
10-204-00-2-D	5 – 500	0.51	µg CN^-/L	Waters	**Total Cyanide**; inline method; low-flow method; Pyridine/barbituric acid, 570 nm**.** NPDES Equivalent; Samples w/ particulates not suitable **Inline module and Standard heater required.**	19-Sep-07
10-204-00-2-E^R	2 – 100	0.5	µg CN^-/L	Waters	**Total Cyanide**; inline method; low-flow method; lower recovery of ferricyanide; Pyridine/barbituric acid, 570 nm**.** NPDES Equivalent; **.** Samples w/ particulates not suitable **Inline module, Standard heater required**	3-Dec-08
10-204-00-2-G^R	0.002 – 0.01 0.1 – 5.0	0.00016 0.015	mg CN^-/L	Waters	**Total Cyanide**; inline method; pyridine-free reagents; can be used w/ 10-204-00-2-H for free cyanide; 600 nm multi-range method; Samples w/ particulates not suitable. **In-line module and standard heater required.**	22-Jun-07

	Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-204-00-4-B[R]	2.0 – 100	0.16	µg CN^-/L	Waters	**WAD Cyanide**; inline method; pyridine-free reagents; Isonicotinic/barbituric acid 600 nm. samples w/ particulates not suitable; **MANIFOLD ONLY**		27-Jul-07
10-204-00-4B52[R]					DEDICATED 220V CHANNEL FOR QC8500 Isonicotinic/barbituric acid 600 nm. samples w/ particulates not suitable **Requires 2 channels, two heaters, one detector and one valve)**		
10-204-00-4-C[R]	2.0 – 100	0.17	µg CN^-/L	Waters	**WAD Cyanide**; Low Flow Method. In line distillation method; pyridine-free reagents; Isonicotinic/barbituric acid 600 nm. Samples w/ particulates not suitable; **Requires an inline module and a standard heater.**		11-Mar-13
Fluoride							
10-109-12-2-AS2#	0.10 – 5.0	0.05	mg F^-/L	Waters	Ion Selective Electrode methods QC8500 Series 2 specific. NPDES / NPDWR Accepted; follows Standard Methods (4500-F-B); **Requires a fluoride detector module**		23-Dec-09
10-109-12-2-CS	0.1-2.0	0.02	mg F/L	Waters	Ion Selective Electrode method. QC8500 Series 1 specific. NPDES Equivalent. Follows Standard Methods 4500 F-B. Requires a Fluoride Detector Module		27 Aug 2003
Formaldehyde							
10-221-00-1-D[R]	0.01-1.0 0.25-10.0	0.002 0.05	mg HCHO/L	Waters	Acetylacetone method. 410 nm. **Requires a standard heater.**		07-Apr-15
Hardness							
10-301-31-1-A [R]*#	5 – 300	0.331	mg $CaCO_3$/L	Waters	Total hardness; calmagite method 630 nm; NPDES Accepted (130.1);		2-Jul-09

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
Iodide						
10-136-09-1-A[R]	0.50 – 10.0	0.3	µg I^-/L	waters	0.2M KOH 420 nm;. **Requires a standard heater**	12-Sep-03
Iron						
10-126-18-1-A[R]	0.1 – 5.0	0.01	mg Fe/L	Waters	Total soluble iron as Fe (II and III); TPTZ indicator; 590 nm. **Inert sample probe required.**	12-Sep-03
10-126-18-1-D[R]	0.1 – 5.0 0.05 – 5.0	0.01	mg Fe/L	Waters	Total soluble iron as Fe (II and III); Ferrozine indicator; 560 nm. Determination in 0.5% HNO_3 matrix (preservation); dual-range method **Inert sample probe required.**	6-Jul-09
Kjeldahl Nitrogen (TKN)						
10-107-06-2-D#	0.5 – 20	0.07	mg N/L	Waters	Kjeldahl digests; Salicylate/nitroprusside; 660 nm. mercury catalyst; NPDES Accepted. **Requires a standard heater.**	1-May-01
10-107-06-2-E #	0.1 – 5.0	0.018	mg N/L	Waters	Kjeldahl digests; Salicylate/nitroprusside; 660 nm. mercury catalyst; NPDES Accepted. **Requires a standard heater**.	5-Dec-07
10-107-06-2-H[R] ^	0.1 – 5.0	0.034	mg N/L	Waters	Kjeldahl digests; Salicylate/ nitroprusside; 660 copper catalyst; NPDES Equivalent (351.2); follows Standard Methods (4500-N_{ORG} D). nm. **Requires a standard heater.**	13-May-08
10-107-06-2-I [R]^	0.5 – 20.0	0.10	mg N/L	Waters	Kjeldahl digests; Salicylate/ nitroprusside; 660 copper catalyst; NPDES Equivalent (351.2). **Requires a standard heater.**	14-May-08
10-107-06-2-K[R] ^	0.1 – 20.0	0.0093	mg N/L	Waters	Kjeldahl digests; mercury catalyst; Salicylate/ nitroprusside; 660 low-flow method; NPDES Equivalent (351.2) **Requires a standard heater.**	15-May-08

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-107-06-2-M^{R}^	0.25 – 25	0.05	mg N/L	Waters	Kjeldahl digests; Salicylate/ nitroprusside; 660 nm, copper catalyst; NPDES Equivalent (351.2) **Requires a standard heater.**	27-Mar-06
10-107-06-2-N^{R}^	0.5 – 20 0.1 – 5.0	0.02 0.04	mg N/L	Waters	Kjeldahl digests Salicylate/ nitroprusside; 660 nm; mercury catalyst; Ultra High Throughput method (>125 samples/hr.); multi-range method; NPDES Equivalent (351.2) **Requires a standard heater.**	12-Sep-07
10-107-06-2-P ^{R}^	0.25 – 25	0.056	mg N/L	Waters	Kjeldahl digests; Salicylate/ nitroprusside; 660 nm. copper catalyst; Ultra High Throughput method (>125 samples/hr.); NPDES Equivalent (351.2). **Requires a standard heater.**	14-Apr-08
10-107-06-2-Q^{R}^	0.5 – 20.0 0.1 – 5.0	0.1 0.04	mg N/L	Waters	Kjeldahl digests; Salicylate/ nitroprusside; 660 nm mercury catalyst; low-flow method; multi-range method NPDES Equivalent (351.2). **Requires a standard heater.**	8-Dec-09
10-107-06-2-S^{R}	0.2-20	0.01	mg N/L	Waters	**Simplified TKN (s-TKN^{TM}).** 520 nm, cadmium reduction . Two channel method TN and NO_2+ NO_3. S-TKN by subtraction. **Requires an in-line module**	14-Jul-10
10-107-06-2-X^{R}^	0.05-20	0.033	mg N/L	Waters	Sodium Salicylate method for MicroDist ^{TM} distillates. Requires a **MicroDist^{TM} block and tubes.** Preserved or unpreserved samples. 660nm. Requires a standard heate. NPDES Equivalent (350.1).	17-Aug-15
10-107-06-5-J	0.1-5.0 0.25-20	0.02 0.05	mg N/L	Waters	Kjeldahl Digests, Salicylate/DCIC **660 nm. copper catalyst**. Gas diffusion method. Sea/brackish water. Can also be used for Ammonia	26-Sept-12

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-107-06-6-D^	0.5 – 20	0.25	mg N/L	Waters	Kjeldahl digests; **copper catalyst**; inline distillation method; NPDES Equivalent (351.2); samples w/ particulates not suitable. 660 nm. Can be used with brackish/seawater digests. **Requires an in-line module and a standard heater or two heated channels (with one heater non-standard).**	31-Jul-09

Kjeldahl Phosphorus (TKP)

10-115-01-1-C^{R}#	0.1 – 5.0	0.015	mg P/L	Waters	Total P; Kjeldahl digests; mercury catalyst; molybdate based method; 880 nm. NPDES Accepted. **Requires a standard heater.**	15-May-01
10-115-01-1-D^{R}#	0.05 – 0.5	0.002	mg P/L	Waters	Total P; Kjeldahl digests; mercury catalyst; molybdate based method; 880 nm **Requires a standard heater.** NPDES Accepted	26-Dec-00
10-115-01-1-I^{R}^	0.1 – 5.0	0.007	mg P/L	Waters	Total P; Kjeldahl digests; mercury catalyst; molybdate based method; ; 880 nm **Requires a standard heater.** NPDES Equivalent (365.4); Ultra High Throughput method (>100 samples/hr)	28-Aug-07
10-115-01-2-B^{R}^	0.10 – 10	0.010	mg P/L	Waters	Total P; Kjeldahl digests; copper catalyst; molybdate based method; ; 880 nm **Requires a standard heater.** NPDES Equivalent (365.4)	27-Mar-06
10-115-01-2-C^{R}^	0.1 – 5.0	0.025	mg P/L	Waters	Total P; Kjeldahl digests; copper catalyst; molybdate based method; Ultra High Throughput method (>120 samples/hr) ; 880 nm . NPDES Equivalent (365.4);. **Requires a standard heater.**	4-Apr-08

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
Manganese						
10-131-35-1-B^{R}	0.2 – 10	0.005	mg Mn/L	Waters	Manganese II Formaldoxime, **0.15% HNO_3** matrix 460 nm.	15-Sep-03
Monochloramine						
10-245-00-1-A	0.01 – 2.0	0.0028	mg N/L as NH_4Cl	Waters	Alkaline phenol-based method; 630 nm; **requires a standard heater**. low-flow method; **Use w/ 10-107-06-1-L for free ammonia**	5-Nov-07
Nitrate + Nitrite						
10-107-04-1-A #^{R}*	0.2 – 20.0	0.01	mg N/L	Waters	Sulfanilamide/NED. Cd reduction method; 520 nm. low-flow method; NPDES / NPDWR Accepted	29-Nov-07
10-107-04-1-B ^{R}#	0.002 – 0.10	0.0003	mg N/L	Waters	Cd reduction method; Sulfanilamide/NED. 520 nm. NPDES / NPDWR Accepted. Omnion 3.0/4.0 data added July 10 2015. Can be run as Ultra High Throughput (120/hr).	29-Nov-07
10-107-04-1-C ^{R}#	0.01 – 2.0 0.05-5.0	0.002 0.004	mg N/L	Waters	Sulfanilamide/NED. Cd reduction method; 520 nm. Ultra High Throughput method/120 samples per hour. NPDES / NPDWR Accepted; follows Standard Methods (4500-NO3-I) **Preserved or unpreserved samples with no pH adjustment needed for samples.**	14-Jul-08; High range support added 12-Apr-13
10-107-04-1-F^{R}^	1 – 50.0	0.12	mg N/L	Waters	Cd reduction method; Sulfanilamide/NED. 520 nm. NPDES Equivalent (353.2). **Requires an internal sample loop valve.**	1-May-08
10-107-04-1-H^	5 – 80.0	0.027	mg N/L	Waters	Sulfanilamide/NED Cd reduction method; 520 nm. dialysis method;NPDES Equivalent (353.2).	1-May-08
10-107-04-1-J^{R} #	0.10 – 10.0	0.012	mg N/L	Waters	Sulfanilamide/NED. Cd reduction method; dialysis method; 520 nm. dialysis method;. NPDES / NPDWR Accepted	29-Nov-07
10-107-04-1-K^{R}#	7-70 0.5 – 5.0	1.0 0.07	µg N/L µM N	Waters	Sulfanilamide/NED. Cd reduction method; 520 nm. low-flow method; NPDES / NPDWR Accepted Omnion 3.0/4.0 data added July 10 2015.	29-Nov-07

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-107-04-1-L^{R} #	0.02 – 2.0	0.002	mg N/L	Waters	Sulfanilamide/NED. Cd reduction method; 520 nm. low-flow method; NPDES / NPDWR Accepted	29-Nov-07
10-107-04-1-M^{R}	0.25 – 14	0.042	µg N/L	Waters	Sulfanilamide/NED Cd reduction method; 540 nm. **2-cm detector method; QC8500 only. Requires a standard heater.** PN 58112 allows replicate injections from a single sample tube.	25-Feb-09
10-107-04-1-O^{R} #	0.05 – 10.0	0.007	mg N/L	Waters	Sulfanilamide/NED. Cd reduction method; 520 nm. NPDES / NPDWR Accepted	29-Nov-07
10-107-04-1-Q^{R}^	0.005 – 0.8 0.5 – 10	0.0005 0.022	mg N/L	Waters	Cd reduction method; low-flow method; Sulfanilamide/NED imidazole buffer; 520 nm. determination in non-preserved and acid preserved samples; multi-range method;. NPDES Equivalent (353.2)	10-Aug-06
10-107-04-1-R^{R}#^*	0.002 – 0.25 0.025 – 20	0.0005 0.0012	mg N/L	Waters	Sulfanilamide/NED. Cd reduction method; 520 nm. Ultra High Throughput method (>120 samples/hr.); multi-range method; NPDES Equivalent; NPDWR Accepted	16-Apr-08
10-107-04-2-A^{R}# *	2 – 100	0.1	mg N/L	Waters	Sulfanilamide/NED.Hydrazine reduction. 520 nm. NPDES/NPDWR Accepted; follows Standard Methods (4500-NO3-I). **Requires a standard heater.**	29-Nov-07
10-107-04-2-D^{R} #	0.05 – 7	0.006	mg N/L	Waters	Sulfanilamide/NED. Hydrazine reduction; 520 nm. NPDES/NPDWR Accepted; follows Standard Methods (4500-NO3-I) **Requires a standard heater.** Omnion 4.0 data added 8 14 2015	14-Jan-02
10-107-04-5-A^{R}	0.02 – 5.0 0.2 – 20	0.009 0.023	mg N/L	Waters	Sulfanilamide/NED **Nitrate Reductase method**; 540 nm. Reagents must be purchased from NECi; multi-range method.	9-Feb-09
10-107-04-6-A^{R}	0.05 – 5.0 0.2 – 20	0.005 0.022	mg N/L	Waters	Sulfanilamide/NED UV Nitrate Reduction; PATENTED 540 nm. **In-line module with UV lamp required.** Multi-range method	4-Sep-09

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
Nitrite						
10-107-05-1-A^{R} # ^	0.01 – 10.0	0.005	mg N/L as NO_2^-	Waters	Nitrite only; Sulfanilamide/NED 520 nm. NPDES Equivalent / NPDWR Accepted (353.2)	29-Nov-07
10-107-05-1-B ^{R}^	0.014 – 0.07	0.0004	mg N/L as NO_2^-	Waters	Nitrite only; Sulfanilamide/NED 520 nm. low-flow method; NPDES Equivalent (353.2)	12-May-08
10-107-05-1-C^{R} ^	0.02 – 2.0	0.0016	mg N/L as NO_2^-	Waters	Nitrite only; Sulfaniliamide/NED 520 nm. low-flow method; NPDES Equivalent (353.2)	21-Aug-03
10-107-05-1-E^{R}	0.05 – 5.0 0.2 – 20	0.03 0.0008	mg N/L as NO_2^-	Waters	Nitrite only**;** Sulfanilamide/NED 540 nm. **companion method for UV reduction method**	9-Sep-09
10-107-05-1-F^{R}^	4-400	0.46	µg N/L as NO2-	Waters	Nitrite only; Sulfaniliamide/NED 520 nm. low-flow method; NPDES Equivalent (353.2)	22-Feb --10
Nitrogen - Total Nitrogen						
10-107-04-3-A^{R}*	200 – 2000	5.6	µg N/L	Waters	Sulfanilamide/NED Cadmium Reduction;540 nm. Total N; inline method; alkaline persulfate digestion; samples w/ particulates not suitable. **In-line sample prep module required. Nitrate/Nitrite support added**.	16-Nov-09
10-107-04-3-B ^{R}*	0.5 – 30.0	0.1	mg N/L	Waters	Sulfanilamide/NED imidazole buffer; Cadmium Reduction; 540 nm. Total N; inline method; alkaline persulfate digestion method; samples w/ particulates not suitable. **In-line sample prep module required. Nitrate/Nitrite support added**.	16-Nov-09
10-107-04-3-C^{R}	0.5 – 10.0	0.011	mg N/L	Waters	Sulfanilamide/NED Cadmium Reduction; 540 nm. Total N; inline method; alkaline persulfate digestion method; samples w/ particulates not suitable **In-line sample prep module required.**	29-Jun-07

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-107-04-3-D[R]	0.05 – 5.0 0.2 – 20.0	0.003 0.008	mg N/L	Waters	Sulfanilamide/NED Cadmium Reduction; 540 nm. Total N; inline method; alkaline persulfate digestion; samples w/ particulates not suitable. **In-line sample prep module required. Nitrate/Nitrite support added**.	2-Dec-12
10-107-04-3-E[R]	0.05 – 10	0.005	mg N/L	Waters	Sulfanilamide/NED; Cadmium Reduction; 540 nm. Total N; inline method; alkaline persulfate digestion; samples w/ particulates not suitable **In-line sample prep module required.**	12-Nov-10
10-107-04-3-P[R]	0.2 – 10.0	0.05	mg N/L	Waters	Sulfanilamide/NED; Cadmium Reduction; 540 nm. Total N; inline method; alkaline persulfate digestion; follows Standard Methods (4500-N-B); samples w/ particulates not suitable.	29-Jun-07
10-107-04-4-A[R]	0.5 – 10	0.02	mg N/L	Waters	Sulfanilamide/NED Cadmium reduction. 520nm. Total N; **manual** alkaline persulfate digestion; low-flow method.	11-Jan-10
10-107-04-4-B[R]	0.02 – 5.0 1.00 – 40.0	0.006 0.024	mg N/L	Waters	Sulfanilamide/NED Cadmium Reduction; 520 nm. Based upon Standard Method 4500-N_{org} (proposed)Total N; dual **manual** persulfate digest; **total phosphorus can be measured from same digest (10-115-01-4-B);** multi-range method**. Nitrate/Nitrite support added**.	22-Jun-07
10-107-04-4-C[R]	0.05-5.0	0.02	mg N/L	Waters	Sulfanilamide/NED. cadmium reduction. Imidazole buffer 540nm. **Single-step**, off-line (autoclave) digestion method. **TP can be measured from the same digestate.**	18-Jun-13

Orthophosphate

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-115-01-1-A^{R}#	0.01 – 2.0 1.0-20	0.002 0.017	mg P/L as PO_4^{2-} mg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; 880 nm. NPDES/NPDWR Accepted; follows Standard Methods (4500-P-G). **Requires a standard heater.**	29-Nov-07
10-115-01-1-B^{R}#	0.01 – 0.20	0.0007	mg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; 880 nm. NPDES/NPDWR Accepted. **Requires a standard heater.**	29-Nov-07
10-115-01-1-M^{R}#	1 – 100	0.1	µg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; 880 nm. NPDES/NPDWR Accepted. **Requires a standard heater.** Omnion 4 data added June 22 2015	29-Nov-07
10-115-01-1-O^{R}*^	1.0 – 20	0.045	mg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; NPDES Equivalent (365.1); Ultra High Throughput method (>120 samples/hr). 880 nm. **Requires a standard heater.**	16-Dec-07
10-115-01-1-P^{R}#	0.05 – 2.00	0.005	mg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; 880 nm. low-flow method; NPDES/NPDWR Accepted. **Requires a standard heater.**	29-Nov-07
10-115-01-1-Q^{R}#	0.010 – 0.20	0.0003	mg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; 880 nm. low-flow method; NPDES/NPDWR Accepted. 880 nm. **Requires a standard heater.**	29-Nov-07
10-115-01-1-V ^{R}#*	0.01 – 2.0 0.2 – 20.0	0.0012 0.0046	mg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; 880 nm. multi-range method; NPDES Equivalent / NPDWR Accepted; Ultra High Throughput method (>125 samples/hr) PN 58112 allows replicate injections from single sample tubes. **Requires a standard heater**	16-Apr-08
10-115-01-1-W^{R}*^	0.25 – 20	0.046	µg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; 880 nm. 2-cm detector method; QC8500 only; **for samples with very low or no silicate**; NPDES Equivalent (365.1). PN 58112 allows replicate injections from single sample tubes. **Requires a non-standard heater.**	22-Feb-08

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-115-01-1-Y R*^	0.5 – 100	0.164	µg P/L as PO_4^{2-}	Waters	Orthophosphate; molybdate based method; 880 nm. 2-cm detector method; QC8500 only; **for samples with high silicate**; NPDES Equivalent (365.1) **Requires a non-standard heater.**	21-Jul-08

Phenol

10-210-00-1-A^R#	5 – 200	0.6	µg phenol/L	Waters	Total recoverable phenol; 4-amino antipyrene method; 500 nm. Macro distillation method; NPDES Accepted.	14-Dec-01
10-210-00-1-B^R #	0.05 – 2.0	0.0013	mg phenol/L	Waters	4-amino antipyrene method; 500 nm. macro distillation method; NPDES Accepted.	18-Oct-07
10-210-00-1-F^R^	0.5-50	0.1	µg phenol/L	Waters	4-Aminoantipyrene with in-line chloroform extraction. 460nm. If samples are pre-distilled, the distillation must be done in glass. **2cm Detector required**. QC8500 ONLY. Must be run alone due to **Pump speed of 20.** 460nm NPDES Equivalent (420.1)	21 Dec 16
10-210-00-1-X ^	0.005 – 0.2 0.05-2.0	0.000856 0.0013	mg phenol/L	Waters	Total recoverable phenolics; MicroDIST® method; 4-aminoantipyrene method; 500 nm. multi-range method; NPDES Equivalent (420.1) .	3-Sep-09
10-210-00-3-A^R 10-210-00-3A51^R 10-210-00-3A52^R	2 – 200	0.28	µg phenol/L	Waters	Volatile phenol; 4-amino antipyrene method; 500 nm. inline method; samples w/ particulates not suitable; This PN **manifold only** QC8500 115V dedicated channel QC8500 220V dedicated channel	20-Dec-06
10-210-00-3-C*^ 10-210-00-3C51*^ 10-210-00-3C52*^	2 – 200	0.61	µg phenol/L	Waters	Volatile phenol; 4-aminoantipyrene method; 500 nm. inline method; NPDES Equivalent (420.4); samples w/ particulates not suitable. This PN **manifold only** QC8500 115V dedicated channel QC8500 220V dedicated channel	15-Oct-08

Method No	Range	MDL	Units	Matrix	Comments	Rev Date

Phosphorus, Total (Acidic Persulfate)

10-115-01-1-E^{R}#	0.2 – 10.0 0.025-5.0	0.1 0.013	mg P/L	Waters	Total P; **manual acidic persulfate digests**; molybdate based method; 880 nm; **requires a standard heater**. NPDES Accepted. 0.025-5.0 mg P/L range added 22 March 2016 (MDL 0.013)	8-Nov-01
10-115-01-1-^{R} #	0.003 – 0.2	0.0009	mg P/L	Waters	Total P; **manual acidic persulfate digests**; molybdate based method; 880 nm; **requires a standard heater**. NPDES Accepted	5-Dec-07
10-115-01-3-A^{R}^	0.1 – 10.0	0.007	mg P/L	Waters	Total P; acidic persulfate digests; molybdate method, 880 nm. NPDES Equivalent (365.3); follows Standard Methods (4500-P-I); samples w/ particulates not suitable. **Requires an in-line sample prep module**. Can also use for orthophosphorus over the same range.	18-Nov-09
10-115-01-3-B^{R}*^	0.1 – 4.0	0.01	mg P/L	Waters	Total P; acidic persulfate digests; molybdate method; 880 nm; NPDES Equivalent (365.3); samples w/ particulates not suitable **Requires an in-line sample prep module.** Can also use for orthophosphorus over the same range.	18-Nov-09
10-115-01-3-C ^{R}*^	0.05 – 1.0	0.0011	mg P/L	Waters	Total P; acidic persulfate digests; molybdate method; 880 nm. NPDES Equivalent (365.3); samples w/ particulates not suitable **Requires an in-line sample prep module.** Can also use for orthophosphorus over the same range.	18-Nov-09
10-115-01-3-E^{R}^	10 – 500	1.4	µg P/L	Waters	Total P; acidic persulfate digests; molybdate method; 880 nm. NPDES Equivalent (365.3); samples w/ particulates not suitable **Requires an in-line sample prep module and standard heater.** Can also use for orthophosphorus over the same range.	5-Jul-07
10-115-01-3-F^{R}^	2 – 100	0.42	µg P/L	Waters	Total P; acidic persulfate digests; molybdate method; 880 nm method; NPDES Equivalent (365.3); samples w/ particulates not suitable	13-Nov-06

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
					Requires an in-line sample prep module and non-standard heater.	
10-115-01-4-B^{R}	0.005 – 1.0 0.25 - 10	0.0006 0.024	mg P/L	Waters	Total P; **manual persulfate** digests; Molybdate method; 880 nm. Dual digest- **total nitrogen can be measured from same digest (10-107-04-4-B)**; Requires a block digester and glassware for the digestion; glass calibration vials. **Requires a standard heater.** Multi range method.	22-Jun-07
10-115-01-4-C^{R}	0.01-1.0	0.002	mg P/L	Waters	Single step, off-line (autoclave) digestion method. Molybdate method. 880nm. **TN can be measured from the same digestate. (10-107-04-4-C) Requires a standard heater.**	26-Jun-13
10-115-01-4-I^{R}^	0.2 – 20.0	0.026	mg P/L	Waters	Total P; **manual persulfate** digests; Molybdate method; 880 nm. Ultra High Throughput method (120 samples /hour) NPDES Equivalent (365.3) **Requires a standard heater.**	11-Nov-08
10-115-01-4-J^{R}*	0.2 – 10	0.0033	mg P/L	Waters	Total P; **manual persulfate** digests; Molybdate chemistry; 880 nm. Ultra High Throughput method (>125 samples/hr) **Requires a standard heater.**	27-Aug-07
Potassium						
10-119-03-1-A^{R}	2.0 – 100	0.33	mg K/L	Waters	Flame emission method. **Flame A.A. and direct voltage module required.**	2-Aug-01
Silicate						
10-114-27-1-A ^{R}#	0.2 – 20	0.04	mg SiO_2/L	Waters	Molybdate reactive method; 820 nm. ANSA reduction NPDES Accepted . Omnion ¾ support added 22 March 2016.	13-Sep-00
10-114-27-1-B^{R} ^	10 – 100	0.58	µg SiO_2/L	Waters	Molybdate reactive method; Stannous chloride reductant. 820 nm. **Plastic sample and standard vials and standard heater required.** Ultra High Throughput method (>120 samples/hr); NPDES Equivalent; follows Standard Methods (4500-SiO2-C)	30-Oct-07

	Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-114-27-1-C^{R}	2.5 – 100	0.61	µg SiO_2/L	Waters		Molybdate reactive method; Stannous chloride reductant. 820 nm. **Plastic sample and standard vials and standard heater required. 2cm detector method; QC8500 only**; NPDES Equivalent; follows Standard Methods (4500-SiO2-C)	17-Feb-09

Sulfate

10-116-10-1-A^{R}	3.0 – 300	0.95	mg SO_4^{2-}/L	Waters		Turbidimetric method; 420 nm.	28-Aug-03
10-116-10-1-C^{R}	0.5 – 10.0	0.2	mg SO_4^{2-}/L	Waters		Turbidimetric method; 420 nm	28-Aug-03
10-116-10-1-G^{R}	50 – 2000		mg SO_4^{2-}/L	Waters		Turbidimetric method; low-flow method; 420 nm.	17-May-08
10-116-10-2-A^{R} ^	5.0 – 100	1.8	mg SO_4^{2-}/L	Waters		Methylthymol blue method; 460 nm. NPDES Equivalent (375.2); follows Standard Methods (4500-SO4-G)	28-Aug-03
10-116-10-2-B^{R}#^	50 – 300	7.2	mg SO_4^{2-}/L	Waters		Methylthymol blue method; 460 nm. NPDES Equivalent / NPDWR Accepted Omnion 4 Support added June 2015	28-Aug-03
10-116-10-2-E^{R}^	2 – 40 5- 100 50-300	0.36 1.22 10.0	mg SO_4^{2-}/L	Waters		Methylthymol blue method; 460 nm. NPDES Equivalent (375.2). **Multi range method**. Omnion 3 or higher support. June 2015	22-Jun-15
10-116-10-2-F^{R}^	20-300	4.0	mg SO_4^{2-}/L	Waters		Methylthymol blue method; 460 nm. NPDES Equivalent (375.2). Omnion 3 or higher support.	11-Mar-16
10-116-10-3-A^{R}^	10 – 300	3.0	mg SO_4^{2-}/L	Waters		Turbidimetric method; 420 nm. based on ASTM method. NPDES Equivalent. 90 injections per hour.	18-Mar-10

Sulfide

10-116-29-1-A^{R} ^	0.02 – 2.0	0.005	mg S/L	Waters		Methylene blue method; . 660 nm. MicroDIST® method; 0.25 M NaOH final matrix **Requires a MicroDist block and tubes and standard heater.** Distillation required; NPDES Equivalent; follows Standard Methods (4500-S-I)	24-May-08

Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-116-29-1-D[R]^	0.01-1.0	0.001	mg S/L	Waters	Methylene blue method. 660 nm. Samples preserved with NaOH (0.025M) and zinc acetate. **No distillation. Requires a standard heater**.	1-Dec-10
10-116-29-1-X[R]	0.02 – 2.00 1 – 100	0.005 0.023	mg S/L	Waters	Methylene blue method; 660 nm. MicroDIST® method; multi-range method **Requires a MicroDist block and tubes and standard heater if** Distillation required (Must have final matrix of 0.25M NaOH)	23-Mar-10
10-116-29-3-A[R]	0.01 – 2.0	0.006	mg S/L	Waters	In line distillation method; 660 nm. **Requires two dedicated channels with one standard and one non-standard heater**; samples w/ particulates not suitable manifold only	4-Oct-07
10-116-29-3A51[R]					Dedicated channels; QC8500 115V	
10-116-29-3A52[R]					Dedicated channels; QC8500 220V	
10-116-29-3B52[R]	1.0 – 10.0	0.2	mg S/L	Waters	In line distillation method; 660 nm. requires two dedicated channels; **Requires two dedicated channels with one standard and one non-standard heater** samples w/ particulates not suitable; Dedicated channels; QC8500 220V	5-Jul-07

Sulfite

10-116-11-1-A[R]	0.25 – 2.0	0.03	mg SO_3^{2-}/L	Waters	Pararosanaline method; 560 nm. Ultra High Throughput method. **Requires a standard heater.**	4-Apr-08

Surfactants (MBAS)

10-306-00-1-C[R]	0.025 – 2.0 0.010 – 1.0	0.004 0.0056	mg/L as LAS mg/L as SDS	Waters	Methylene blue method; 650 nm. dual extraction method. SDS or LAS. Glass calibration and standard vials must be used.	19-Dec-08
10-306-00-1-D[R]^	0.010 – 1.0	0.0024	mg SDS/L	Waters	Methylene blue method; 650 nm.single extraction method; NPDES Equivalent; follows Standard Methods (5540-C). SDS. Glass calibration and standard vials must be used.	25-Mar-08

	Method No	Range	MDL	Units	Matrix	Comments	Rev Date
10-306-00-1-E[R]	0.1 – 20.0	0.05	mg SDS/L	Waters		Methylene blue method; 650 nm. dual extraction method (SDS only) Glass calibration and standards vials must be used.	29-Sep-05
10-306-00-1-F	0.06-2.4	0.009	mg LAS/L	Waters		Methylene blue method; 650 nm. dual extraction method (LAS only) Glass calibration and standards vials must be used. SM5540C/ASTM2330-02	9-Apr-14

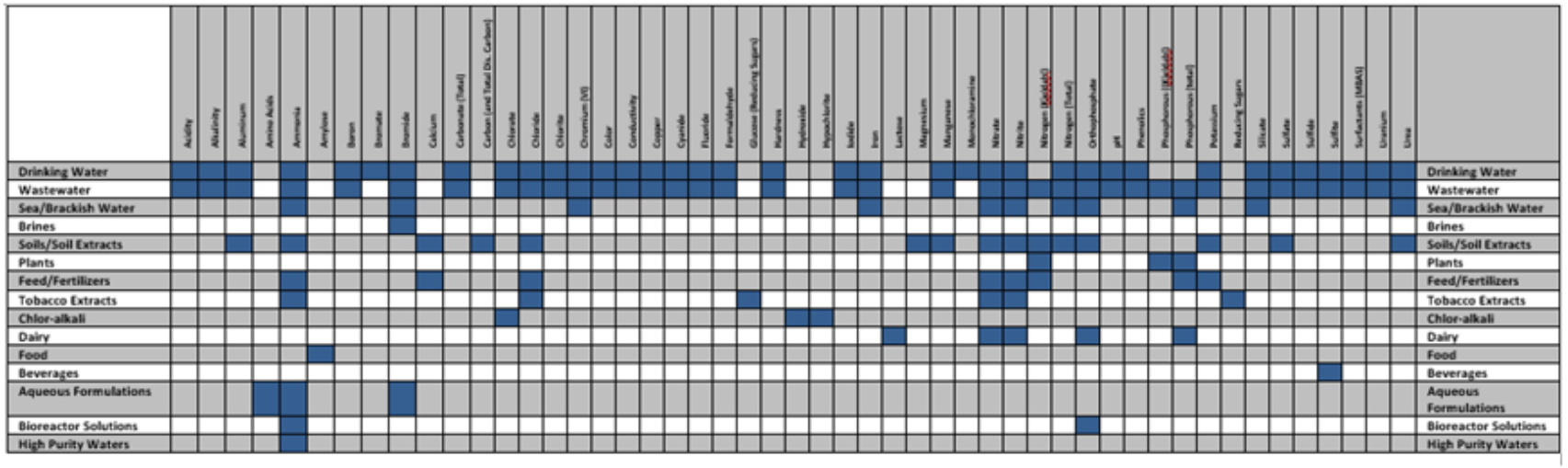
Uranium

10-125-00-1-A[R]	0.3-50	0.03	mg U_3O_8	Waters		2-(5-bromo-2pyridylazo)-5-diethylaminophenol (Br-PADAP). 580 nm. 50 samples per hour	18-Sept-03

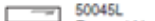
Urea

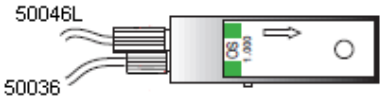
10-206-00-1-B[R]	5 – 500	3.3	µg N/L as Urea	Waters		Diacetyl monoxime/thiosemicarbazide. 530 nm. **Cannot be run simultaneously w/ other methods** as uses 0.84 M NaCl wash solution. **Requires non-standard heater and 60 position sample racks**.	15-Apr-08

Method Matrix



Selected Parts. Please note this is NOT a complete listing






50237A Cadmium Column


50254 Cadmium Column Maintainence kit

50065 Flow cell flare, 13 cm
50067 Flow cell flare, 35 cm
31933 Flow cell, 10mm

Nipples

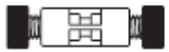
50015 Large
50015A Small
50014L Reducing
50019 Stainless Steel

Interference Filters
89### ### indicates the wavelength

24927 Switching Valve
50962 Flare Kit for Nitrate
50963 Flare Kit for Sulfate
24012 Connector, Amber
24015 Washer

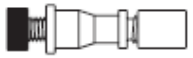
Union Fitting


50913


50901

Small Pump Tube Adapter


50906


85287 for QC8500

Large Pump Tube Adapter


85293 for QC8500


50907

PumpTube Adapter

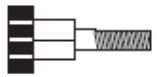

50905


85269 for QC8500


50009
Tube Connector, Amber


31077 for QC8000 Valve
Valve Connector, White


85245
One-piece fitting
for QC8500 valve

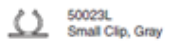

28051L
Rheodyne Nut & Ferrule

28058 Rheodyne Ferrule


28057
Upchurch Nut & Ferrule


50013
O-ring, Viton


50024L
Large Clip, Gray


50023L
Small Clip, Gray

50913 Teflon
Union Fitting


(ultem nuts)


50007 or 85258 for QC8500
Large Collar, Black

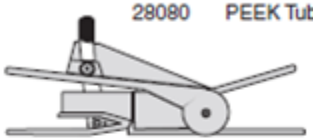

50006 or 85257 for QC8500
Small Collar, White


50060
O-ring Probe


50100L
Degassing Tube


50031
Scalpel

28081
Blades for PEEK Tubing Cutter



28080 PEEK Tubing Cutter

50021
Transmission Tubing, PVC, 0.030" ID

50029
Transmission Tubing, PVC, 0.060" ID

Teflon Tubing

50927 Manifold, 0.022" ID, Green
50928 Manifold, 0.032" ID
41300L Tefzel Tubing, 0.040" ID x 0.060" OD
30928 Zeus Tubing, 0.032" ID

50091 Microloop Tubing, Teflon, 16 cm
50092 Microloop Tubing, Teflon, 12.5 cm

hole to hole (in), end to end (cm)

Coils

Size	Coil Support Only	Wrapped, Teflon 0.022" ID	Wrapped, Teflon 0.032" ID
1" or 4.5 cm	50016L	50981	50916
2" or 7cm	50018L	50982	50918
2.5" or 8 cm	50017	50983	50917
4" or 12cm	50020	50984	50920
8" or 22 cm	50022L	N/A	50922

Alternating Coils 12 cm

Coil Support Only	Wrapped, Teflon 0.022" ID	Wrapped, Teflon 0.032" ID
50039	50985	50921

Pump Tubing

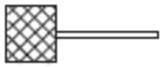
534XX PVC
544XX Duraprene
494XX Silicone
654XX Acidflex

XX is the number that specifies the pump tube color:

05 Orange-Yellow, 0.020" ID
06 Orange-White, 0.025" ID
07 Black-Black, 0.030" ID
08 Orange-Orange, 0.035" ID
09 White-White, 0.040" ID
10 Red-Red, 0.045" ID
11 Gray-Gray, 0.051" ID
12 Yellow-Yellow, 0.056" ID
13 Blue-Blue, 0.065" ID
14 Green-Green, 0.073" ID
15 Purple-Purple, 0.081" ID
16 Purple-Black, 0.090" ID
17 Purple-Orange, 0.100" ID
18 Purple-White, 0.110" ID
19 Yellow-Blue, 0.060" ID

Bottles

28193L Glass Bottle, 1000 mL
35102 Glass Bottle, 2000 mL
43915 Glass Bottle, 100 mL (includes cap)



50012
O-ring Remover

50062
Drill Bit

28101L
End Plug

LIT 2841 09 October 2020 Rev. 2

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