



Analytical Methods Approved for Compliance Monitoring under the Ground Water Rule

Analysis for the following contaminants shall be conducted in accordance with the methods in the following table or their equivalent as determined by EPA. The methods and monitoring requirements for these contaminants are specified in 40 CFR 141.402 and 141.403. Additional methods are listed in Appendix A to Subpart C of Part 141.

The CFR is the legal reference for approved methods and takes precedent over this table. The table should accurately reflect the analytical methods information published in 40 CFR 141. If you find discrepancies, please notify The Safe Drinking Water Hotline (800-426-4791) so that EPA can correct the table.

Contaminant				EPA Publication Number	Source of Method
Method	Organization	Reference Title	Date		
Microbial Contaminants					
Escherichia coli					
The time from sample collection to initiation of analysis may not exceed 30 hours. The ground water system is encouraged but is not required to hold samples below 10°C during transit.					
A standard sample volume of at least 100 mL must be collected for fecal indicator analysis regardless of the fecal indicator or analytical method used.					
1604	EPA	Total Coliforms and <i>Escherichia coli</i> (<i>E. coli</i>) in Water by Membrane Filtration by Using a Simultaneous Detection Technique (MI Medium)	September 2002	EPA 821-R-02-024	http://www.epa.gov/nerlcwww/online.htm
This method incorporates MI agar into Standard Method 9222 as described for the analysis of Total Coliforms in the Total Coliform Rule [141.21(f)].					
9221 F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
EC-MUG (Method 9221 F) or NA-MUG (Method 9222 G) can be used for <i>E. coli</i> testing step as described in 141.21(f)(6)(i) or (iii) after use of Standard Methods 9221 B, 9221 D, 9222 B, or 9222 C.					
9222 G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
EC-MUG (Method 9221 F) or NA-MUG (Method 9222 G) can be used for <i>E. coli</i> testing step as described in 141.21(f)(6)(i) or (iii) after use of Standard Methods 9221 B, 9221 D, 9222 B, or 9222 C.					
9223	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
Colilert®, Colisure®, and Colilert-18® media are approved for use.					
9223	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
Colilert®, Colisure®, and Colilert-18® media are approved for use.					

Contaminant				EPA Publication Number	Source of Method
Method	Organization	Reference Title	Date		

Microbial Contaminants

Escherichia coli

The time from sample collection to initiation of analysis may not exceed 30 hours. The ground water system is encouraged but is not required to hold samples below 10°C during transit.

A standard sample volume of at least 100 mL must be collected for fecal indicator analysis regardless of the fecal indicator or analytical method used.

9223 B-97	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
Colilert®, Colisure®, and Colilert-18® media are approved for use.					

E*Colite® Test	Charm Sciences, Inc.	Charm E*Colite Test, "Charm E*Colite Presence/Absence Test for Detection and Identification of Coliform Bacteria and <i>Escherichia coli</i> in Drinking Water"	January 9, 1998		Charm Sciences, Inc
----------------	----------------------	---	-----------------	--	---------------------

m-ColiBlue24® Test	Hach Co.	m-ColiBlue 24 Test, "Total Coliforms and <i>E. coli</i> Membrane Filtration Method with m-ColiBlue 24 Broth," Method No. 10029, Revision 2.	August 17, 1999		Hach Company
--------------------	----------	---	-----------------	--	--------------

Enterococci

The time from sample collection to initiation of analysis may not exceed 30 hours. The ground water system is encouraged but is not required to hold samples below 10°C during transit.

A standard sample volume of at least 100 mL must be collected for fecal indicator analysis regardless of the fecal indicator or analytical method used.

1600	EPA	Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl-B-D-Glucoside Agar (mEI)	September 2002	EPA 821-R-02-022	http://www.epa.gov/nerlcwww/online.htm
------	-----	--	----------------	------------------	---

EPA Method 1600 is an approved variation of Standard Method 9230 C. The holding time and temperature for ground water samples are specified in the rule (see above note), rather than as specified in Section 8 of EPA Method 1600.

9230 B	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
--------	------------------	--	------	--	------------------

9230 C	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
--------	------------------	--	------	--	------------------

Contaminant				EPA	
Method	Organization	Reference Title	Date	Publication Number	Source of Method

Microbial Contaminants

Enterococci

The time from sample collection to initiation of analysis may not exceed 30 hours. The ground water system is encouraged but is not required to hold samples below 10°C during transit.

A standard sample volume of at least 100 mL must be collected for fecal indicator analysis regardless of the fecal indicator or analytical method used.

Enterolert	IDEXX Laboratories, Inc.	Budnick, G.E., <i>et.al</i> , Evaluation of Enterolert for Enumeration of Enterococci in Recreational Waters, Applied and Environmental Microbiology, 62:3881-3884	1996		IDEXX Laboratories, Inc.
------------	--------------------------	--	------	--	--------------------------

Coliphage

The time from sample collection to initiation of analysis may not exceed 30 hours. The ground water system is encouraged but is not required to hold samples below 10°C during transit.

A standard sample volume of at least 100 mL must be collected for fecal indicator analysis regardless of the fecal indicator or analytical method used.

1601	EPA	Male-specific (F+) and Somatic Coliphage in Water by Two-step Enrichment Procedure	April 2001	EPA 821-R-01-030	http://www.epa.gov/nerlcwww/online.htm
1602	EPA	Male-specific (F+) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure	April 2001	EPA 821-R-01-029	http://www.epa.gov/nerlcwww/online.htm

Disinfectants

Free Chlorine

If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine may be measured using DPD colorimetric test kits.

If approved by the State, free chlorine may be measured using ITS free chlorine test strips. Use of the test strips is described in Method D99-003, "Free Chlorine Species (HOCl- and OCl-) by Test Strip," Revision 3.0, November 21, 2003, available from Industrial Test Systems, Inc., 1875 Langston St., Rock Hill, SC 29730.

4500-C1 D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-C1 D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-C1 D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-C1 D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods

Contaminant				EPA Publication Number	Source of Method
Method	Organization	Reference Title	Date		

Disinfectants

Free Chlorine

If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine may be measured using DPD colorimetric test kits.

If approved by the State, free chlorine may be measured using ITS free chlorine test strips. Use of the test strips is described in Method D99-003, "Free Chlorine Species (HOCl- and OCl-) by Test Strip," Revision 3.0, November 21, 2003, available from Industrial Test Systems, Inc., 1875 Langston St., Rock Hill, SC 29730.

4500-Cl D-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
4500-Cl F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-Cl F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-Cl F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-Cl F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-Cl F-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
4500-Cl G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-Cl G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-Cl G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods

Contaminant				EPA Publication Number	Source of Method
Method	Organization	Reference Title	Date		
Disinfectants					
Free Chlorine					
If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine may be measured using DPD colorimetric test kits.					
If approved by the State, free chlorine may be measured using ITS free chlorine test strips. Use of the test strips is described in Method D99-003, "Free Chlorine Species (HOCl- and OCl-) by Test Strip," Revision 3.0, November 21, 2003, available from Industrial Test Systems, Inc., 1875 Langston St., Rock Hill, SC 29730.					
4500-Cl G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-Cl G-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
4500-Cl H	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-Cl H	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-Cl H	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-Cl H	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-Cl H-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
D1253-03	ASTM International	Annual Book of ASTM Standards, Vol. 11.01			http://www.astm.org
D1253-86	ASTM International	Annual Book of ASTM Standards, Vol. 11.01			http://www.astm.org

Contaminant				EPA Publication Number	Source of Method
Method	Organization	Reference Title	Date		
Disinfectants					
Total Chlorine If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine may be measured using DPD colorimetric test kits.					
4500-Cl D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-Cl D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-Cl D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-Cl D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-Cl D-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
4500-Cl E	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-Cl E	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-Cl E	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-Cl E	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-Cl E-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/

Contaminant				EPA Publication Number	Source of Method
Method	Organization	Reference Title	Date		
Disinfectants					
Total Chlorine If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine may be measured using DPD colorimetric test kits.					
4500-Cl F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-Cl F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-Cl F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-Cl F	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-Cl F-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
4500-Cl G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-Cl G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-Cl G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-Cl G	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-Cl G-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/

Contaminant				EPA	
Method	Organization	Reference Title	Date	Publication Number	Source of Method
Disinfectants					
Total Chlorine If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine may be measured using DPD colorimetric test kits.					
4500-Cl I	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-Cl I	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-Cl I	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-Cl I	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-Cl I-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
D1253-03	ASTM International	Annual Book of ASTM Standards, Vol. 11.01			http://www.astm.org
D1253-86	ASTM International	Annual Book of ASTM Standards, Vol. 11.01			http://www.astm.org
Chlorine Dioxide					
327 Rev 1.1	EPA	Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry	May 2005	EPA 815-R-05-008	http://www.epa.gov/safewater/methods/sourcalt.html
4500-ClO2 C	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods

Contaminant				EPA	
Method	Organization	Reference Title	Date	Publication Number	Source of Method
Disinfectants					
Chlorine Dioxide					
4500-CIO2 C	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-CIO2 C	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-CIO2 C	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-CIO2 C-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
4500-CIO2 D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-CIO2 D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-CIO2 D	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-CIO2 E	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-CIO2 E	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-CIO2 E	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-CIO2 E	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods

Contaminant				EPA Publication Number	Source of Method
Method	Organization	Reference Title	Date		
Disinfectants					
Chlorine Dioxide					
4500-CIO2 E-00	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/
Ozone					
4500-O3 B	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 18th Edition	1992		Standard Methods
4500-O3 B	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 19th Edition	1995		Standard Methods
4500-O3 B	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 20th Edition	1998		Standard Methods
4500-O3 B	Standard Methods	Standard Methods for the Examination of Water and Wastewater, 21st Edition	2005		Standard Methods
4500-O3 B-97	Standard Methods Online	Online version of Standard Methods for the Examination of Water and Wastewater. Approval year by Standard Methods Committee is designated by last 2 digits. This is the only online version that is approved.			http://www.standardmethods.org/

Contact information for methods that are not available on the Internet are summarized in the report titled "Sources of Approved Analytical Methods for National Drinking Water Regulations."