



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(c)(2). 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.

§141.402(c)(2)– Analytical Methods

- (1) 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.
- (2) Collection of a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used (§141.402(b)(3))
- (3) Analysis of all ground water source samples using one of the analytical methods listed in the §141.402(c)(2) of this section for the presence of *E.coli*, enterococci, or coliphage.

The procedures must be conducted with the documents listed at §141.402(c)(2) or one of the alternative methods listed in Appendix A to Subpart C of Part 141. For Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions of the method that maybe used. For vendor methods, the date of the method listed in §141.402(c)(2) or Appendix A to Subpart C of Part 141 is the date/version of the approved method. Laboratories should be careful to use only the approved versions of the methods as product packaging inserts may not be the same as the approved versions of the methods.

- (a) Laboratory certification- systems must have all compliance samples required under this subpart analyzed by a laboratory certified by EPA or a primacy state to analyze drinking water samples. The laboratory used by the system must be certified for each method (and associated contaminant(s)) used for compliance monitoring analyses under this rule.
- (b) Incorporate by reference – The methods required in §141.402(c)(2) are incorporated by reference into the regulation.

Contaminant

Escherichia coli - Procedure (following Lactose Fermentation Methods):

Method	Organization	Reference Title/Source	Date	Notes
9221 F	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 20 th Edition Standard Methods	1998	EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for <i>E.coli</i> testing step after use of Standard Methods 9221B, 9221D, 9222B, or 9222C
9221 F	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 22 nd Edition Standard Methods	2012	EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for <i>E.coli</i> testing step after use of Standard Methods 9221B, 9221D, 9222B, or 9222C
9221 F	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 23 rd Edition Standard Methods	2017	EC-MUG (Method 9221F) can be used for <i>E.coli</i> testing step after use of Standard Methods 9221B, 9221D, 9222B, or 9222C
9221 F -06	Standard Methods Online	Online version. Approval year is designated by the last 2 digits. Only online versions cited in the regulations or in Appendix A to Subpart C of Part 141 are approved. Standard Methods	2006	EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for <i>E.coli</i> testing step after use of Standard Methods 9221B, 9221D, 9222B, or 9222C

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Escherichia coli - Partition methods:

Method	Organization	Reference Title/Source	Date	Notes
9222 G.1c(2)	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 20 th Edition Standard Methods	1998	EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for <i>E.coli</i> testing step after use of Standard Methods 9221B, 9221D, 9222B, or 9222C
9222 I	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 23 rd Edition Standard Methods	2017	NA-MUG (Method 9222I) can be used for <i>E.coli</i> testing step after use of Standard Methods 9221B, 9221D, 9222B, or 9222C

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Escherichia coli - membrane filtration methods:

Method	Organization	Reference Title/Source	Date	Notes
1604	EPA	Method 1604: Total Coliforms and <i>Escherichia coli</i> in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium), September 2002 EPA Method 1604	2002	
m-ColiBlue24® Test	Hach Company	Membrane Filtration Method m-ColiBlue24® Broth, Revision 2, August 17, 1999 m-ColiBlue 24 Test	1999	
9222 J	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 23 rd Edition Standard Methods	2017	
Chromocult	EMD Millipore	Chromocult® Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and <i>Escherichia coli</i> for Finished Waters, November 2000, Version 1.0 Chromocult	2000	

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Escherichia coli - enzyme substrate methods:

Method	Organization	Reference Title/Source	Date	Notes
9223 B Colilert®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 20 th Edition Standard Methods	1998	
9223 B Colilert®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 21 st Edition Standard Methods	2005	
9223 B Colilert®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 22 nd Edition Standard Methods	2012	

Method	Organization	Reference Title/Source	Date	Notes
9223 B Colilert®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater, 23rd Edition</i> Standard Methods	2017	
9223 B-97 Colilert®	Standard Methods Online	Online version. Approval year is designated by the last 2 digits. Only online versions cited in the regulations or in Appendix A to Subpart C of Part 141 are approved.	1997	
9223 B-04 Colilert®	Standard Methods Online	Online version. Approval year is designated by the last 2 digits. Only online versions cited in the regulations or in Appendix A to Subpart C of Part 141 are approved.	2004	
9223 B Colisure®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater, 20th Edition</i> Standard Methods	1998	
9223 B Colisure®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater, 21st Edition</i> Standard Methods	2005	
9223 B Colisure®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater, 22nd Edition</i> Standard Methods	2012	
9223 B Colisure®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater, 23rd Edition</i> Standard Methods	2017	
9223 B-97 Colisure®	Standard Methods Online	Online version. Approval year is designated by the last 2 digits. Only online versions cited in the regulations or in Appendix A to Subpart C of Part 141 are approved.	1997	

Method	Organization	Reference Title/Source	Date	Notes
9223 B-04 Colisure®	Standard Methods Online	Online version. Approval year is designated by the last 2 digits. Only online versions cited in the regulations or in Appendix A to Subpart C of Part 141 are approved.	2004	
9223 B Colilert-18®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 20 th Edition Standard Methods	1998	
9223 B Colilert-18®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 21 st Edition Standard Methods	2005	
9223 B Colilert-18®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 22 nd Edition Standard Methods	2012	
9223 B Colilert-18®	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 23 rd Edition Standard Methods	2017	
9223 B-97 Colilert-18®	Standard Methods Online	Online version. Approval year is designated by the last 2 digits. Only online versions cited in the regulations or in Appendix A to Subpart C of Part 141 are approved.	1997	
9223 B-04 Colilert-18®	Standard Methods Online	Online version. Approval year is designated by the last 2 digits. Only online versions cited in the regulations or in Appendix A to Subpart C of Part 141 are approved.	2004	

Method	Organization	Reference Title/Source	Date	Notes
E*Colite®	Charm Sciences	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 E*Colite	1998	
Readycult®	EMD Millipore	Readycult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and <i>Escherichia coli</i> in Finished Waters, January 2007, Version 1.1 Readycult	2007	
Modified Colitag®	CPI International, Inc.	Modified Colitag™ Test Method for the Simultaneous Detection of <i>E. coli</i> and other Total Coliforms in water (ATP D05- 0035), August 28, 2009 Modified Colitag	2009	
Tecta EC/TC, v. 1.0	Veolia Water Solutions and Technologies	Tecta™ EC/TC medium and the Tecta™ Instrument: A Presence/Absence Method for the Simultaneous Detection of Total Coliforms and <i>Escherichia coli</i> (<i>E. coli</i>) in Drinking Water, May 2014, Version 1.0 Tecta, Version 1.0	2014	
Tecta EC/TC, v. 2.0	Pathogen Detection Systems, Inc.	Tecta™ EC/TC medium and the Tecta™ Instrument: A Presence/Absence Method for the Simultaneous Detection of Total Coliforms and <i>Escherichia coli</i> (<i>E. coli</i>) in Drinking Water, March 2017, Version 2.0 Tecta, Version 2.0		

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Enterococci – Multiple Tube Technique methods:

Method	Organization	Reference Title/Source	Date	Notes
9230 B	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 20 th Edition Standard Methods	1998	
9230 B-04	Standard Methods Online	Online version. Approval year is designated by the last 2 digits. Only online versions cited in the regulations or in Appendix A to Subpart C of Part 141 are approved. Standard Methods	2004	

Enterococci – membrane filtration methods:

Method	Organization	Reference Title/Source	Date	Notes
9230 C	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 20 th Edition Standard Methods	1998	
9230 C	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 23 rd Edition Standard Methods	2017	
1600	EPA	EPA Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl- β -D-Glucoside Agar (mEI) EPA 821-R-02-022 September 2002 EPA Method 1600 (2002)	2002	

Enterococci – enzyme substrate methods:

Method	Organization	Reference Title/Source	Date	Notes
Enterolert	Applied and Environmental Microbiology	Budnick, G.E., R.T. Howard, D.R. Mayo. 1996. "Evaluation of Enterolert for Enumeration of Enterococci in Recreation Waters". Applied and Environmental Microbiology. 62:3881-3884.	1996	
9230 D	Standard Methods	<i>Standard Methods for the Examination of Water and Wastewater</i> , 23 rd Edition Standard Methods	2017	Fluorogenic Substrate Enterococcus Test using Enterolert

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Coliphage:

Method	Organization	Reference Title/Source	Date	Notes
1601	EPA	EPA 1601: Male-specific (F+) and Somatic Coliphage in Water by Two-step Enrichment Procedure, April 2001 EPA Method 1601 (2001)	2001	
1602	EPA	EPA 1602: Male-specific (F+) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure, April 2001 EPA Method 1602 (2001)	2001	
Fast Phage®	Charm Sciences	Fast Phage Test Presence/Absence for Coliphage in Ground Water with Same Day Positive Prediction, ATP Case No. D09-0007, Version 009, November 28, 2012 Fast Phage Test, v. 009	2012	