

**Environmental Protection Agency**

**§ 141.852**

of EPA, where EPA acts as the State, must comply with decisions made by EPA for implementation of subpart Y. EPA has authority to establish such procedures and criteria as are necessary to implement subpart Y.

(e) *Violations of national primary drinking water regulations.* Failure to comply with the applicable requirements of §§141.851 through 141.861, including requirements established by the State pursuant to these provisions, is a violation of the national primary drinking water regulations under subpart Y.

**§ 141.852 Analytical methods and laboratory certification.**

(a) *Analytical methodology.* (1) The standard sample volume required for analysis, regardless of analytical method used, is 100 ml.

(2) Systems need only determine the presence or absence of total coliforms

and *E. coli*; a determination of density is not required.

(3) The time from sample collection to initiation of test medium incubation may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10 deg. C during transit.

(4) If water having residual chlorine (measured as free, combined, or total chlorine) is to be analyzed, sufficient sodium thiosulfate ( $\text{Na}_2\text{S}_2\text{O}_3$ ) must be added to the sample bottle before sterilization to neutralize any residual chlorine in the water sample. Dechlorination procedures are addressed in Section 9060A.2 of *Standard Methods for the Examination of Water and Wastewater* (20th and 21st editions).

(5) Systems must conduct total coliform and *E. coli* analyses in accordance with one of the analytical methods in the following table or one of the alternative methods listed in Appendix A to subpart C of part 141.

Organism	Methodology category	Method <sup>1</sup>	Citation <sup>1</sup>
Total Coliforms	Lactose Fermentation Methods	Standard Total Coliform Fermentation Technique.	Standard Methods 9221 B.1, B.2 (20th ed.; 21st ed.) <sup>2,3</sup>
		Presence-Absence (P-A) Coliform Test	Standard Methods Online 9221 B.1, B.2-99 <sup>2,3</sup> Standard Methods 9221 D.1, D.2 (20th ed.; 21st ed.) <sup>2,7</sup>
	Membrane Filtration Methods	Standard Total Coliform Membrane Filter Procedure.	Standard Methods Online 9221 D.1, D.2-99 <sup>2,7</sup> Standard Methods 9222 B, C (20th ed.; 21st ed.) <sup>2,4</sup> Standard Methods Online 9222 B-97 <sup>2,4</sup> , 9222 C-97 <sup>2,4</sup> EPA Method 1604. <sup>2</sup>
		Membrane Filtration using MI medium	EPA Method 1604. <sup>2</sup>
		m-ColiBlue24 <sup>®</sup> Test <sup>2,4</sup> .	
		Chromocult <sup>®</sup> .	
	Enzyme Substrate Methods	Colliert <sup>®</sup> .	Standard Methods 9223 B (20th ed.; 21st ed.) <sup>2,5</sup>
		Colisure <sup>®</sup> .	Standard Methods Online 9223 B-97 <sup>2,5</sup> Standard Methods 9223 B (20th ed.; 21st ed.) <sup>2,5,6</sup>
		E*Colite <sup>®</sup> Test <sup>2</sup> .	Standard Methods Online 9223 B-97 <sup>2,5,6</sup>
		ReadyCult <sup>®</sup> Test <sup>2</sup> .	Standard Methods Online 9223 B-97 <sup>2,5,6</sup>
		modified Collitag <sup>®</sup> Test <sup>2</sup> .	Standard Methods Online 9223 B-97 <sup>2,5,6</sup>
	<i>Escherichia coli</i> Procedure (following Lactose Fermentation Methods).	EC-MUG medium	Standard Methods 9221 F.1 (20th ed.; 21st ed.) <sup>2</sup>
	<i>Escherichia coli</i> Partition Method	EC broth with MUG (EC-MUG)	Standard Methods 9222 G.1q(2) (20th ed.; 21st ed.) <sup>2,8</sup>
		NA-MUG medium	Standard Methods 9222 G.1q(1) (20th ed.; 21st ed.) <sup>2</sup> EPA Method 1604. <sup>2</sup>
	Membrane Filtration Methods	Membrane Filtration using MI medium	Standard Methods 9223 B (20th ed.; 21st ed.) <sup>2,5</sup>
		m-ColiBlue24 <sup>®</sup> Test <sup>2,4</sup> .	Standard Methods Online 9223 B-97 <sup>2,5,6</sup>
		Chromocult <sup>®</sup> .	Standard Methods 9223 B (20th ed.; 21st ed.) <sup>2,5,6</sup> Standard Methods Online 9223 B-97 <sup>2,5,6</sup>
	Enzyme Substrate Methods	Colisure <sup>®</sup> .	Standard Methods Online 9223 B-97 <sup>2,5,6</sup>
		E*Colite <sup>®</sup> Test <sup>2</sup> .	Standard Methods Online 9223 B-97 <sup>2,5,6</sup>
		ReadyCult <sup>®</sup> Test <sup>2</sup> .	Standard Methods Online 9223 B-97 <sup>2,5,6</sup>
		modified Collitag <sup>®</sup> Test <sup>2</sup> .	Standard Methods Online 9223 B-97 <sup>2,5,6</sup>

<sup>1</sup> The procedures must be done in accordance with the documents listed in paragraph (c) of this section. For Standard Methods, either editions, 20th (1998) or 21st (2005), may be used. For the Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in paragraph (c) of this section is the date/version of the approved method. The methods listed are the only versions that may be used for compliance with this rule. Laboratories should be careful to use only the approved versions of the methods, as product package inserts may not be the same as the approved versions of the methods.

- <sup>2</sup> Incorporated by reference. See paragraph (c) of this section.
- <sup>3</sup> Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between lactose broth and lauryl tryptose broth using the water normally tested, and if the findings from this comparison demonstrate that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10 percent.
- <sup>4</sup> All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series. Alternatively, membrane filtration equipment that is pre-sterilized by the manufacturer (i.e., disposable funnel units) may be used.
- <sup>5</sup> Multiple-tube and multi-well enumerative formats for this method are approved for use in presence-absence determination under this regulation.
- <sup>6</sup> Colisure® results may be read after an incubation time of 24 hours.
- <sup>7</sup> A multiple tube enumerative format, as described in *Standard Methods for the Examination of Water and Wastewater* 9221, is approved for this method for use in presence-absence determination under this regulation.
- <sup>8</sup> The following changes must be made to the EC broth with MUG (EC-MUG) formulation: Potassium dihydrogen phosphate, KH<sub>2</sub>PO<sub>4</sub>, must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

(b) *Laboratory certification.* Systems must have all compliance samples required under this subpart analyzed by a laboratory certified by the 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.

(c) *Incorporation by reference.* The standards required in this section are incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, EPA must publish notice of change in the FEDERAL REGISTER and the material must be available to the public. All approved material is available for inspection either electronically at [www.regulations.gov](http://www.regulations.gov), in hard copy at the Water Docket, or from the sources indicated below. The Docket ID is EPA-HQ-OW-2008-0878. Hard copies of these documents may be viewed at the Water Docket in the EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is 1-202-566-1744, and the telephone number for the Water Docket is 1-202-566-2426. Copyrighted materials are only available for viewing in hard copy. These documents are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 1-202-741-6030 or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(1) American Public Health Association, 800 I Street, NW., Washington, DC 20001.

(i) “Standard Methods for the Examination of Water and Wastewater,” 20th edition (1998):

(A) Standard Methods 9221, “Multiple-Tube Fermentation Technique for Members of the Coliform Group,” B.1, B.2, “Standard Total Coliform Fermentation Technique.”

(B) Standard Methods 9221, “Multiple-Tube Fermentation Technique for Members of the Coliform Group,” D.1, D.2, “Presence-Absence (P–A) Coliform Test.”

(C) Standard Methods 9222, “Membrane Filter Technique for Members of the Coliform Group,” B, “Standard Total Coliform Membrane Filter Procedure.”

(D) Standard Methods 9222, “Membrane Filter Technique for Members of the Coliform Group,” C, “Delayed-Incubation Total Coliform Procedure.”

(E) Standard Methods 9223, “Enzyme Substrate Coliform Test,” B, “Enzyme Substrate Test,” Colilert® and Colisure®.

(F) Standard Methods 9221, “Multiple Tube Fermentation Technique for Members of the Coliform Group,” F.1, “*Escherichia coli* Procedure: EC–MUG medium.”

(G) Standard Methods 9222, “Membrane Filter Technique for Members of the Coliform Group,” G.1.c(2), “*Escherichia coli* Partition Method: EC broth with MUG (EC–MUG).”

(H) Standard Methods 9222, “Membrane Filter Technique for Members of the Coliform Group,” G.1.c(1), “*Escherichia coli* Partition Method: NA–MUG medium.”

(ii) “Standard Methods for the Examination of Water and Wastewater,” 21st edition (2005):

(A) Standard Methods 9221, “Multiple-Tube Fermentation Technique for Members of the Coliform Group,” B.1, B.2, “Standard Total Coliform Fermentation Technique.”

(B) Standard Methods 9221, “Multiple-Tube Fermentation Technique for Members of the Coliform Group,” D.1, D.2, “Presence-Absence (P–A) Coliform Test.”

(C) Standard Methods 9222, “Membrane Filter Technique for Members of the Coliform Group,” B, “Standard Total Coliform Membrane Filter Procedure.”

(D) Standard Methods 9222, “Membrane Filter Technique for Members of the Coliform Group,” C, “Delayed-Incubation Total Coliform Procedure.”

(E) Standard Methods 9223, “Enzyme Substrate Coliform Test,” B, “Enzyme Substrate Test,” Colilert® and Colisure®.

(F) Standard Methods 9221, “Multiple Tube Fermentation Technique for Members of the Coliform Group,” F.1, “*Escherichia coli* Procedure: EC-MUG medium.”

(G) Standard Methods 9222, “Membrane Filter Technique for Members of the Coliform Group,” G.1.c(2), “*Escherichia coli* Partition Method: EC broth with MUG (EC-MUG).”

(H) Standard Methods 9222, “Membrane Filter Technique for Members of the Coliform Group,” G.1.c(1), “*Escherichia coli* Partition Method: NA-MUG medium.”

(iii) “Standard Methods Online” available at <http://www.standardmethods.org>:

(A) Standard Methods Online 9221, “Multiple-Tube Fermentation Technique for Members of the Coliform Group” (1999), B.1, B.2-99, “Standard Total Coliform Fermentation Technique.”

(B) Standard Methods Online 9221, “Multiple-Tube Fermentation Technique for Members of the Coliform Group” (1999), D.1, D.2-99, “Presence-Absence (P-A) Coliform Test.”

(C) Standard Methods Online 9222, “Membrane Filter Technique for Members of the Coliform Group” (1997), B-97, “Standard Total Coliform Membrane Filter Procedure.”

(D) Standard Methods Online 9222, “Membrane Filter Technique for Members of the Coliform Group” (1997), C-97, “Delayed-Incubation Total Coliform Procedure.”

(E) Standard Methods Online 9223, “Enzyme Substrate Coliform Test” (1997), B-97, “Enzyme Substrate Test”, Colilert® and Colisure®.

(2) Charm Sciences, Inc., 659 Andover Street, Lawrence, MA 01843-1032, telephone 1-800-343-2170:

(i) E\*Colite®—“Charm E\*Colite™ Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Drinking Water,” January 9, 1998.

(ii) [Reserved]

(3) CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA, 95403, telephone 1-800-878-7654:

(i) modified Colitag®, ATP D05-0035—“Modified Colitag™ Test Method for the Simultaneous Detection of *E. coli*

and other Total Coliforms in Water,” August 28, 2009.

(ii) [Reserved]

(4) EMD Millipore (a division of Merck KGaA, Darmstadt Germany), 290 Concord Road, Billerica, MA 01821, telephone 1-800-645-5476:

(i) Chromocult—“Chromocult® Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and *Escherichia coli* for Finished Waters,” November 2000, Version 1.0.

(ii) ReadyCult®—“ReadyCult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters,” January 2007, Version 1.1.

(5) EPA’s Water Resource Center (MC-4100T), 1200 Pennsylvania Avenue NW., Washington, DC 20460, telephone 1-202-566-1729:

(i) EPA Method 1604, EPA 821-R-02-024—“EPA Method 1604: Total Coliforms and *Escherichia coli* in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium),” September 2002, <http://www.epa.gov/nerlcwww/1604sp02.pdf>.

(ii) [Reserved]

(6) Hach Company, P.O. Box 389, Loveland, CO 80539, telephone 1-800-604-3493:

(i) m-ColiBlue24®—“Membrane Filtration Method m-ColiBlue24® Broth,” Revision 2, August 17, 1999.

(ii) [Reserved]

[78 FR 10354, Feb. 13, 2013, as amended at 79 FR 10669, Feb. 26, 2014]

**§ 141.853 General monitoring requirements for all public water systems.**

(a) *Sample siting plans.* (1) Systems must develop a written sample siting plan that identifies sampling sites and a sample collection schedule that are representative of water throughout the distribution system not later than March 31, 2016. These plans are subject to State review and revision. Systems must collect total coliform samples according to the written sample siting plan. Monitoring required by §§141.854 through 141.858 may take place at a customer’s premise, dedicated sampling station, or other designated compliance sampling location. Routine and repeat sample sites and any sampling