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TRADUTOR PÚBLICO JURAMENTADO E INTÉRPRETE COMERCIAL
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(Available at <http://www.regulations.gov>; docket ID No. EPA-HQ-OW-2019- 0558.) -----

 USEPA. 2000. EPA Method 515.4, Revision 1.0. Determination of Chlorinated Acids in Drinking Water by Liquid-Liquid Microextraction, Derivatization and Fast Gas Chromatography with Electron Capture Detection. EPA/815/B-00/001. April 2000. (Available at <http://www.regulations.gov>; docket ID No. EPA-HQ-OW-2018-0558 and at <https://www.nemi.gov>.) ----

 USEPA. 2001. EPA Method 531.2, Revision 1.0. Measurement of N- methylcarbamoyloximes and N- methylcarbamates in Water by Direct Aqueous Injection HPLC with Postcolumn Derivatization. EPA 815-B- 01-002. September 2001. (Available at <http://www.regulations.gov>; docket ID No. EPA-HQ-OW-2018-0558 and at <https://www.nemi.gov> .) -----

 USEPA. 2016. Expedited Approval of Alternate Test Procedures for the Analysis of Contaminantes under the Safe Drinking Water Act; Analysis and Sampling Procedures. 81 FR 46839. July 19, 2016. (Available at <http://www.regulations.gov>; docket ID No. EPA-HQ-OW-2018-0558.) --

 USEPA. 2018 EPA Method 900.0, Rev. 1.0. Gross Alpha and Gross Beta Radioactivity in Drinking Water. EPA 815-B-18-002. February 2018. (Available at Available at <http://www.regulations.gov>; docket ID No. EPA-HQ-OW-2018-0558 and at the National Service Center for Environmental Publications (EPA Method 900.0 Rev 1.0). -----

Lista de Assuntos em 40 CFR Parte 141 -----

Proteção ambiental, produtos químicos, terras indígenas, relações intergovernamentais, relatórios e requisitos de manutenção de registros, abastecimento de água. -----

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Data: 28 de setembro de 2018. -----

Peter Grevatt, -----
Diretor do Escritório de Águas Subterrâneas e Água Potável.

Pelas razões expostas no preâmbulo, a Agência de Proteção Ambiental emenda a 40 CFR parte 141 como segue: -----

PARTE 141- REGULAMENTOS NACIONAIS PRIMÁRIOS PARA ÁGUA POTÁVEL -----

1. A citação de autoridade para a parte 141 continua com a redação abaixo: -----

Autoridade: 42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, 300j-9, e 300j-11. -----

2. Altera o Apêndice A da subparte C da parte 141 como segue: -----

a. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.23(k) (1).``

b. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.24(e) (1).``

c. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.25(a).``

d. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.74(a) (1).``

e. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA RESÍDUOS DESINFETANTES LISTADOS EM 40 CFR 141.74(a) (2).`` -----

f. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.131(b) (1).`` -----

g. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA RESÍDUOS DESINFETANTES LISTADOS EM 40 CFR



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141.131 (c) (1) .'' -----
 h. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTE PARA PARÂMETROS LISTADOS EM 40 CFR 141.131(d) .'' ----
 i. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.402 (c) (2) .'' -----
 j. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.852 (a) (5) .'' -----
 k. Revisa a tabela intitulada ``MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 143.4 (b) .'' --
 l. Revisa notas de rodapé 9, 14, 16, 18, 22- 23, 25-26, 29, 31, 34-39, e 48. -----
 m. Acrescenta as notas de rodapé 49-52. -----
 As revisões e acréscimos têm a redação abaixo:-----

Apêndice A da Subparte C da Parte 141- Métodos de Teste Alternativos aprovados para Análises Sob a Lei de Água Potável-----

* * * * *

MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.23(k)(1)								
Contaminante	Metodologia	Método EPA	SM 21ª Edição ¹	SM 22ª Edição ^{2B}	SM 23ª Edição ^{4B}	SM Online ³	ASTM ⁴	Outros
Alcalinidade	Tritimétrica		2320 B	2320 B	2320 B		D1067-06 B, 11 B, 16 B	
Antimônio	Hidreto - Absorção Atômica						D 3697-07, -12	
	Absorção Atômica; Forno		3113 B	3113 B	3113 B	3113 B-04,		
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 ²				B-10		
Arsenic	Absorção Atômica; Forno		3113 B	3113 B	3113 B		D 2972-08 C, -15 C	
	Absorção Atômica de Hidreto		3114 B	3114 B	3114 B	3113 B-04, B-10.	D 2972-08 B, -15 B	
	Espectrometria de emissão atômica com plasma acoplado indutivamente	200.5, Revisão 4.2 ²				3114 B-09		



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	axialmente (AVICP-AES).							
Barium	Plasma Acoplado Indutivamente		3120 B	3120 B	3120 B			
	Absorção Atômica; Direta		3111 D	3111 D	3111 D			

MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.23(k)(1)—Continuação								
Contaminante	Metodologia	Método EPA	SM 21 ^a Edição ¹	SM 22 ^a Edição ^{2a}	SM 23 ^a Edição ^{4a}	SM Online ³	ASTM ⁴	Outros
	Absorção Atômica; Forno		3113 B	3113 B	3113 B	3113 B-04, B-10		
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 ²						
Berílio	Plasma Acoplado Indutivamente		3120 B	3120 B	3120 B		D 3645-08 B, -15 B	
	Absorção Atômica; Forno		3113 B	3113 B	3113 B	3113 B-04, B-10.		
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 ²						
Cádmio	Absorção Atômica; Forno		3113 B	3113 B	3113 B	3113 B-04, B-10		
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 ²					D 511-09, -14 A	
Cálcio	EDTA titrimétrica		3500-Ca B	3500-Ca B	3500-Ca B		D 511-09, -14 B	
	Absorção Atômica; Aspiração Direta		3111 B	3111 B	3111 B			
	Plasma Acoplado Indutivamente		3120 B	3120 B	3120 B			
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 ²					D 6919-09	
	Cromatografia Iônica							
Cromo	Plasma Acoplado Indutivamente		3120 B	3120 B	3120 B			
	Absorção Atômica; Forno		3113 B	3113 B	3113 B	3113 B-04, B-10		
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 ²					D 1688-07, -12 C	
Cobre	Absorção Atômica; Forno		3113 B	3113 B	3113 B	3113 B-04, B-10.	D 1688-07, -12 A	
	Absorção Atômica; Aspiração Direta		3111 B	3111 B	3111 B			
	Plasma Acoplado Indutivamente		3120 B	3120 B	3120 B			
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 ²						
	Colorimetria		2510 B	2510 B	2510 B		D 1125-14 A	Método Hach 8026; 35 Hach Method 10272.36
Condutividade	Condutância		4500-CN# C	4500-CN# C	4500-CN# C		D 2036-06 A	
Cianeto	Destilação Manual com MgCl ₂ seguida de:		4500-CN# G.	4500-CN# G.	4500-CN# G.	4500-CN# C-99.	D 2036-06 B	



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	Espectrofotometria, Receptiva		4500- CN# E	4500-CN# E	4500-CN# E		D2036- 06 A	
	Espectrofotometria Manual		4500- CN# F	4500-CN# F	4500-CN# F			
	Eletrodo Seletivo							
	Cromatografia Gasosa/Espectrometria de Massa Headspace.		4110 B	4110 B	4110 B		D 4327- 11	ME355.01.7
Fluoreto	Cromatografia Iônica		4500-F# B,D	4500-F# B,D	4500-F# B,D			
	Destilação manual; SPADNS Colorimétrica.		4500-F# C	4500-F# C	4500-F# C		D 1179- 04, 10 B, 16 B	
	Eletrodo Manual		4500-F# E	4500-F# E	4500-F# E			
	Alizarin Automatizado							
	SPADNS Colorimétrica Livre de Arsenito		3113 B	3113 B	3113 B	3113 B-04, B- 10.	D 3559- 08 D, 15 D	Método Hach SPADNS 2 10225.22
Chumbo	Absorção Atômica; Forno							
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 2	3111 B	3111 B	3111 B		D 511- 09, -14 B	
Magnésio	Absorção Atômica		3120 B	3120 B	3120 B			
	Plasma Acoplado Indutivamente		3500-Mg B	3500-Mg B	3500-Mg B		D 511- 09, -14 A	
	Métodos Titrimétricos de Complexação Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).							
	Cromatografia Iônica	200.5, Revisão 4.2 2					D 6919- 09	
Mercurio	Manual, Vapor Frio		3112 B	3112 B	3112 B	3112 B-09	D 3223- 12	
Níquel	Plasma Acoplado Indutivamente		3120B	3120B	3120B			
	Absorção Atômica; Direta		3111 B	3111 B	3111 B			
	Absorção Atômica; Forno		3113 B	3113 B	3113 B	3113 B-04, B- 10		
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).							
Nitrato	Cromatografia Iônica	200.5, Revisão 4.2 2	4110 B	4110 B	4110 B		D 4327- 11	
	Redução Automatizada de Cádmio		4500- NO3 #	4500-NO3 #	4500-NO3 #			
	Redução Manual de Cádmio		4500- NO3 #	4500-NO3 #	4500-NO3 #			
	Eletrodo Seletivo Iônico		4500- NO3 # D.	4500-NO3 # D.	4500-NO3 # D.			
	Redução/Colorimétrica							System Easy (1-Reagente); ⁸ NECi Nitrato- Redutase ⁴⁰
	Colorimétrico; Direto							Método Hach TNTplus™ 835/836 10206. ²³
	Eletrforese de ions capilares						D 6508- 15	
Nitrato	Cromatografia Iônica		4110 B	4110 B	4110 B		D 4327- 11	

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MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.23(k)(1) — Continuação								
Contaminante	Metodologia	Método EPA	SM 21ª Edição 1	SM 22ª Edição 28	SM 23ª Edição 49	SM Online 3	ASTM 4	Outros
	Metodologia		4500-NO3 ¥ F.	4500-NO3 ¥ F.	4500-NO3 ¥ F.			
	Redução Automatizada de Cádmi		4500-NO3 ¥ E.	4500-NO3 ¥ E.	4500-NO3 ¥ E.			
	Redução Manual de Cádmi		4500-NO2 ¥ B.	4500-NO2 ¥ B.	4500-NO2 ¥ B.			
	Espectrofotometria.							
	Redução/Colorimétrica							Systema Easy (1-Reagente); 8 NECI Nitro-Redutase 40
	Eletroforese de íons capilares		4110 B	4110 B	4110 B		D 6508-15	
Ortofosfato	Cromatografia Iônica		4500-P E	4500-P E	4500-P E	4500-P E-99	D 4327-11	
	Colorimétrico, ácido ascórbico, reagente único.		4500-P F	4500-P F	4500-P F	4500-P F-99		
	Colorimétrico, Automatizado, Ácido Ascórbico							Thermo Fisher Discrete Analyzer.41
	Eletroforese de íons capilares						D 6508-15	
pH.	Eletrométrico.	150.3 48	4500-H+ B ..	4500-H+ B ..	4500-H+ B ..		D 1293-12	
Selênio	Absorção Atômica com Hidreto		3114 B	3114 B	3114 B	3114 B-09	D 3859-08 A, -15 A	
	Absorção Atômica; Forno		3113 B	3113 B	3113 B	3113 B-04, B-10.	D 3859-08 B, -15 B	
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 2						
Silica	Colorimétrico.						D859-05, 10, 16	
	Molibdilicaco		4500-SiO2 C	4500-SiO2 C	4500-SiO2 C			
	Azul heteropólio		4500-SiO2 D	4500-SiO2 D	4500-SiO2 D			
	Automatizado para sílica reativa a molibdato.		4500-SiO2 E	4500-SiO2 E	4500-SiO2 E			
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 2						
	Plasma Acoplado Indutivamente		3120 B.	3120 B.	3120 B.			
Sódio	Absorção Atômica; Aspiração Direta.		3111 B.	3111 B.	3111 B.			
	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2 2						
	Cromatografia Iônica.						D 6919-09	
Temperatura	Termométrico		2550	2550	2550	2550-10		

MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.24(e)(1)						
Contaminante	Metodologia	Método EPA	SM 21ª Edição 1	SM 22ª Edição,28 SM 23ª	SM Online 3	

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Contaminante	Metodologia	Método EPA	SM 21ª Edição 1	SM 22ª Edição, 28 SM 23ª Edição 49	SM Online 3
	Cromatografia Gasosa/Deteção por Captura de Elétrons (GC/ECD)		6640 B	6640 B	6640 B-01,B-06
Di(2-etilhexil)adipato.	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Di(2-etilhexil)ftalato	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Dibromocloro-propano (DBCP).	Purga e Retenção/Cromatografia Gasosa/Espectrometria de Massa	524.3.9			
Dinoseb	Cromatografia Gasosa/Deteção por Captura de Elétrons (GC/ECD)		6640 B	6640 B	6640 B-01,B-06
Endrin	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Etil dibromida (EDB)	Purga e Retenção/Cromatografia Gasosa/Espectrometria de Massa	524.3.9			
Glifosato	Cromatografia líquida de alta eficiência (HPLC) com derivatização pós-coluna e detecção de fluorescência.		6651 B	6651 B	6651 B-00,B-05
Heptacloro	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Heptacloro Epóxido	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Hexaclorobenzeno	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Hexaclorociclopentadieno	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Lindano	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Metoxicloro	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Oxamil	Cromatografia líquida de alta eficiência (HPLC) com derivatização pós-coluna e detecção de fluorescência.		6610 B	6610 B	6610 B-04
PCBs (como Arocloros)	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Pentaclorofenol	Cromatografia Gasosa/Deteção por Captura de Elétrons (GC/ECD)		6640 B	6640 B	6640 B-01,B-06
	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS)	525.3.24			
Picloram	Cromatografia Gasosa/Deteção por Captura de Elétrons (GC/ECD)		6640 B	6640 B	6640 B-01,B-06
Simazina	Cromatografia Líquida com Ionização de Eletrospray Combinada com Espectrometria de Massa (LC/ESI-MS/MS).	536.25			
	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24	523.26		
Toxafeno	Extração em Fase Sólida/Cromatografia Gasosa/Espectrometria de Massa (GC/MS).	525.3.24			
Trihalometanos totais	Purga e Retenção/Cromatografia Gasosa/Espectrometria de Massa	524.3.9	524.4.29		

MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.25(a)

Contaminante	Metodologia	Método EPA	SM 21ª Edição 1	SM 22ª Edição, 28 SM 23ª Edição 49	ASTM 4	SM Online 3
Ocorrendo naturalmente:						
Alfa e beta brutos	Evaporação	900.0, Rev. 1.0 50	7110 B	7110 B		
	Cintilação Líquida				D 7283-17	7110 D-17.
Alfa bruto	Coprecipitação		7110 C	7110 C		
Rádio 226	Emanação de radônio		7500-Ra C	7500-Ra C	D 3454-05.	
	Radioquímica		7500-Ra B	7500-Ra B	D 2460-07.	
	Espectrometria Gama			7500-Ra E		7500-Ra E-07.
Rádio 228	Radioquímica		7500-Ra D	7500-Ra D		
	Espectrometria Gama			7500-Ra E		7500-Ra E-07.



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Urânio	Radioquímica	7500-U B	7500-U B	
	ICP-MS	3125		D 5673-05, 10, 16.
	Alfa espectrometria	7500-U C	7500-U C	D 3972-09.
	Fosforimetria a Laser			D 5174-07.
	Espectrometria Alfa por Cintilação Líquida.			D 6239-09.
Artificial:	Radioquímica	7500-Cs B	7500-Cs B	
Césio Radioativo	Espectrometria de Raios Gama	7120	7120	D 3649-06.
	Radiochemical	7500-I B	7500-I B	D 3649-06.
Iodo Radioativo		7500-I C	7500-I C	
		7500-I D	7500-I D	
	Espectrometria de Raios Gama	7120	7120	D 4785-08.
Estrôncio Radioativo 89, 90.	Radioquímica	7500-Sr B	7500-Sr B	
Tritio	Cintilação Líquida	7500-3H B	7500-3H B	D 4107-08.
Emissores Gama	Raio Gama	7120	7120	D 3649-06.
	Espectrométrico.	7500-Cs B	7500-Cs B	D 4785-08.
		7500-I B	7500-I B	

MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.74(a)(1)

Organismo	Metodologia	SM 21ª Edição 1	SM 22ª Edição 28	SM 23ª Edição 49	SM Online 3	Outros
Coliformes Totais	Técnica de Fermentação Coliforme Total.	9221 A, B, C	9221 A, B, C	9221 A, B, C	9221 A, B, C-06.	
	Técnica de Filtro de Membrana Coliforme Total.	9222 A, B, C		9222 A, B, C.		
	Teste ONPG-MUG	9223	9223 B	9223 B	9223 B-04.	
Coliformes Fecais	Procedimento Coliforme Fecal.	9221 E	9221 E	9221 E	9221 E-06.	
	Procedimento de filtro coliforme fecal.	9222 D	9222 D	9222 D	9222 D-06.	
Bactérias heterotróficas	Método de Inoculação em Profundidade	9215 B	9215 B	9215 B	9215 B-04.	
Turbidez	Método Nefelométrico	2130 B	2130 B	2130 B		Método Hach 8195, Rev. 3.0. ⁵²
	Nefelometria a Laser (on-line).					Mitchell M5271, 10 Mitchell M5331, Rev. 1.2.42 Lovibond PTV 6000. ⁴⁶
	Nefelometria LED (on-line).					Mitchell M5331, 11 Mitchell M5331, Rev. 1.2.42 Lovibond PTV 2000. ⁴⁵
	Nefelometria LED (on-line).					AMI Turbiwell, 15 Lovibond PTV 1000. ⁴⁴
	Nefelometria LED (portable).					Orion AQ4500. ¹²
	Nefelometria 360°					Método Hach 10258 Rev. 1.0, 39 Método Hach 10258, Rev. 2.0. ⁵¹

MÉTODOS ALTERNATIVOS DE TESTES PARA RESÍDUOS DESINFETANTES LISTADOS EM 40 CFR 141.74(a)(2)

Residual	Metodologia	SM 21ª Edição 1	SM 22nd edition, 28 SM 23ª Edição 49	ASTM 4	Outros
Cloro Livre	Titulação amperométrica	4500-CI D	4500-CI D	D 1253-08, -14.	
	Titulometria Ferrosa DPD	4500-CI F	4500-CI F		
	Colorimétrico DPD	4500-CI G	4500-CI G		Método Hach 10260. ³¹
	Colorimétrico Indofenol				Método Hach 10241. ³⁴
	Syringaldazine (FACTS)	4500-CI H	4500-CI H		
	Analizador de Cloro On-line				EPA 334.0. ¹⁶
	Sensor Amperométrico				ChloroSense. ¹⁷
Cloro Total	Titulação amperométrica	4500-CI D	4500-CI D	D 1253-08, -14.	
	Titulação amperométrica (Medição de baixo nível).	4500-CI E	4500-CI E		
	Titulometria Ferrosa DPD	4500-CI F	4500-CI F		
	Colorimétrico DPD	4500-CI G	4500-CI G		Método Hach 10260. ³¹



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	Eletrodo Iodométrico	4500-CI I	4500-CI I		
	Analizador de Cloro On-line				EPA 334.0. ¹⁶
	Sensor Amperométrico				ChloroSense. ¹⁷
Dióxido de cloro	Titulação amperométrica	4500-CIO2 C	4500-CIO2 C		
	Titulação amperométrica	4500-CIO2 E.	4500-CIO2 E.		
	Sensor Amperométrico				ChlordiaX Plus. ³²
Ozônio	Método Índigo	4500-O3 B	4500-O3 B		

MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.131(b)(1)

Contaminante	Metodologia	Método EPA	ASTM ⁴	SM online ³	SM 21ª Edição ¹	SM 22ª Edição, ²⁸ SM 23ª Edição ⁴⁹	Outros
TTHM	P&T/GC/MS	524.3,9 524.4.29					
HAA5	LLE (diazometano)/GC/ECD			6251 B- 07	6251 B	6251 B.	
	Cromatografia com Ionização de Eletrospray Combinada com Espectrometria de Massa (IC-ESI-MS/MS).	557.14					
	Cromatografia de Ions Bidimensional (IC) com Detecção de Condutividade Suprimida.						Thermo Fisher 557.1. ⁴⁷
Bromato	Cromatografia Bidimensionais de Ions (IC).	302.0.18					
	Cromatografia com Ionização de Eletrospray Combinada com Espectrometria de Massa (IC-ESI-MS/MS).	557.14					
	Cromatografia de ions com supressão química.		D 6581-08 A.				
	Cromatografia de Ions com supressão eletrolítica.		D 6581-08 B.				

MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.131(b)(1)—Continuação

Contaminante	Metodologia	Método EPA	ASTM ⁴	SM online ³	SM 21ª Edição ¹	SM 22ª Edição, ²⁸ SM 23ª Edição ⁴⁹	Outros
Clorito	Cromatografia de ions com supressão química.		D 6581-08 A.				
	Cromatografia de Ions com supressão eletrolítica.		D 6581-08 B.				
Clorito—	monitoramento diário conforme prescrito em 40 CFR 141.132(b)(2)(i)(A).	Titulação amperométrica.			4500-CIO2 E	4500-CIO2 E.	
	Sensor Amperométrico						ChlordiaX Plus. ³²

MÉTODOS ALTERNATIVOS DE TESTES PARA RESÍDUOS DESINFETANTES LISTADOS EM 40 CFR 141.131(c)(1)

Residual	Metodologia	SM 21ª Edição ¹	SM 22ª Edição, ²⁸ SM 23ª Edição ⁴⁹	ASTM ⁴	Outros
Cloro Livre	Titulação amperométrica	4500-CI D	4500-CI D	D 1253-08, -14.	
	Titulometria Ferrosa DPD	4500-CI F	4500-CI F		
	Colorimétrico DPD	4500-CI G	4500-CI G		Método Hach 10260. ³¹
	ndophenol Colorimetric				Método Hach 10241. ³⁴
	Syringaldazine (FACTS)	4500-CI H	4500-CI H		
	Sensor Amperométrico				ChloroSense. ¹⁷
	Analizador de Cloro On-line				EPA 334.0. ¹⁶
Cloro combinado	Titulação amperométrica	4500-CI D	4500-CI D	D 1253-08, -14.	
	Titulometria Ferrosa DPD	4500-CI F	4500-CI F		
	Colorimétrico DPD	4500-CI G	4500-CI G		Método Hach 10260. ³¹
Cloro total	Titulação amperométrica	4500-CI D	4500-CI D	D 1253-08, -14.	
	Low level Amperometric Titra-tion.	4500-CI E	4500-CI E		
	Titulometria Ferrosa DPD	4500-CI F	4500-CI F		
	Colorimétrico DPD	4500-CI G	4500-CI G		Método Hach 10260. ³¹
	Eletrodo Iodométrico	4500-CI I	4500-CI I		
	Sensor Amperométrico				ChloroSense. ¹⁷
	Analizador de Cloro On-line				EPA 334.0. ¹⁶
Dióxido de cloro	Amperometric Method II	4500-CIO2 E	4500-CIO2 E		

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Sensor Amperométrico							Chlordiox Plus. ³²
MÉTODOS ALTERNATIVOS DE TESTE PARA PARÂMETROS LISTADOS EM 40 CFR 141.131(d)							
Parâmetro	Metodologia	SM 21ª Edição ¹	SM 22ª Edição ²⁸	SM 23ª Edição ⁴⁹	SM online ³	EPA	Outros
Carbono Orgânico Total (TOC)	Combustão a alta temperatura	5310 B	5310 B	5310 B		415.3, Rev 1.2. ¹⁹	
	Persulfato-Ultravioleta ou Oxidação de Persulfato Aquecida.	5310 C	5310 C	5310 C		415.3, Rev 1.2. 19.	Método Hach 10267.38
	Oxidação Úmida	5310 D	5310 D			415.3, Rev 1.2. ¹⁹	
	Oxidação do Ozônio						Método Hach 10261.37
Absorção Ultravioleta Específica (SUVA)	Cálculo usando dados DOC e UV ₂₅₄ .					415.3, Rev 1.2. ¹⁹	
Carbono Orgânico Dissolvido (DOC).	Combustão a alta temperatura	5310 B	5310 B	5310 B		415.3, Rev 1.2. ¹⁹	
	Oxidação de Persulfato Ultravioleta ou Persulfato Aquecido.	5310 C	5310 C	5310 C		415.3, Rev 1.2. ¹⁹	
	Oxidação Úmida	5310 D	5310 D			415.3, Rev 1.2. ¹⁹	
Absorção ultravioleta a 254 nm (UV ₂₅₄).	Espectrofotometria	5910 B	5910 B	5910 B	5910 B-11	415.3, Rev 1.2. ¹⁹	
MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.402(c)(2)							
Organismo	Metodologia	SM 20ª Edição ⁶	SM 21ª Edição ¹	SM 22ª Edição ²⁸	SM 23ª Edição ⁴⁹	SM online ³	Outros
E. coli	Colilert		9223 B	9223 B	9223 B	9223 B-97, B-04	
	Colisure		9223 B	9223 B	9223 B	9223 B-97, B-04	
	Colilert-18	9223 B	9223 B	9223 B	9223 B	9223 B-97, B-04	
	Readycult→						Readycult→ ²⁰
	Colitag						Colitag Modificado. ^{TM 13}
	Chromocult→						Chromocult→ ²¹
	EC-MUG						
	NA-MUG						
MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.402(c)(2)—Continuação							
Organismo	Metodologia	SM 20ª Edição ⁶	SM 21ª Edição ¹	SM 22ª Edição ²⁸	SM 23ª Edição ⁴⁹	SM online ³	Outros
	Teste m-ColiBlue24 Tecta EC/TC ^{33 43}				9222 J.		
Enterococci	Técnica de Tubos Múltiplos					9230 B-04	
	Técnicas de filtro de membrana.				9230 C.		
	Substrato Fluorogênico Teste de Enterococcus (usando Enterolert).				9230 D.		
Colifago	Procedimento de Presença-Ausência com Enriquecimento em Duas Etapas.						Fast Phage. ³⁰
MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 141.852(a)(5)							
Organismo	Categoria metodológica	Método	SM 20ª, 21ª edições ¹⁶	SM 22ª Edição ²⁸	SM 23ª Edição ⁴⁹	SM online ³	
Coliformes Totais	Métodos de fermentação de lactose.	Técnica de Fermentação para Coliforme Total Padrão.			9221 B.1, B.2	9221 B.1, B.2, B.3, B.4.	9221 B.1, B.2-06.
		Teste de Presença-Ausência (P-A) de				9221 D.1, D.2, D.3.	

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		Coliforme.				
	Métodos de filtração por membrana.	Procedimento de Filtro de Membrana para Coliforme Total Padrão.			9222 B, C.	
		Deteção simultânea de Coliformes Totais e E. coli por procedimento de Filtro de Membrana Cromogênico Duplo (using meio mColiBlue24).			9222 J.	
	Métodos de Substrato de Enzima	Colilert →	9223 B	9223 B	9223 B-04.	
		Colisure →	9223 B	9223 B	9223 B-04.	
		Colilert-18	9223 B	9223 B	9223 B-04.	
		Tecta EC/TC 33 43				
Escherichia coli	Procedimento para Escherichia coli (após Métodos de Fermentação de Lactose)	Meio EC-MUG	9221 F.1.	9221 F.1	9221 F.1-06.	
	Métodos de Particionamento de Escherichia coli (após Métodos de Filtração por Membranas).	Caldo EC com MUG (EC-MUG).		9222 H.		
		Meio NA-MUG		9222 I.		
	Deteção simultânea de Coliformes Totais e E. coli por procedimento de Filtro de Membrana Cromogênico Duplo.	meio mColiBlue24		9222 J.		
	Métodos de Substrato de Enzima	Colilert →	9223 B	9223 B	9223 B-04.	
		Colisure →	9223 B	9223 B	9223 B-04.	
		Colilert-18	9223 B		9223 B-04.	
		Tecta EC/TC 33 43				

MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 143.4(b)

Contaminante	Metodologia	Método EPA	ASTM ⁴	SM 21 ^a Edição ¹	SM 22 ^a Edição, ^{2a} SM 23 ^a Edição ^{4a}	SM online ³
Alumínio.	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2. ²				
	Absorção Atômica; Direta			3111 D	3111 D	
	Absorção Atômica; Forno			3113 B	3113 B	3113 B-04, B-10.
	Plasma Acoplado Indutivamente			3120 B	3120 B	
Cloro	Titulação de nitrato de prata		D 512-04 B, 12 B.	4500-CI	4500-CI	
	Cromatografia Iônica		D 4327-11	4110 B	4110 B	
	Titulação Potenciométrica			4500-CI# D ..	4500-CI# D ..	
Cor	Comparação visual			2120 B	2120 B	
Agentes Espumantes	Substâncias Ativas com Azul de Metileno (MBAS)			5540 C	5540 C	
Ferro	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2. ²				
	Absorção Atômica; Direta			3111 B	3111 B	
	Absorção Atômica; Forno			3113 B	3113 B	3113 B-04, B-10.
	Plasma Acoplado Indutivamente			3120 B	3120 B	



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MÉTODOS ALTERNATIVOS DE TESTES PARA CONTAMINANTES LISTADOS EM 40 CFR 143.4(b)—Continuação						
Contaminante	Metodologia	Método EPA	ASTM ⁴	SM 21 ^a Edição ¹	SM 22 ^a Edição, ^{2a} SM 23 ^a Edição ^{4o}	SM online ³
Manganês	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2. ²				
	Absorção Atômica; Direta			3111 B	3111 B	
	Absorção Atômica; Forno			3113 B	3113 B	3113 B-04, B-10.
	Plasma Acoplado Indutivamente			3120 B	3120 B	
Odor	Teste de Odor Limiar			2150 B	2150 B	
Prata	Espectrometria de emissão atômica com plasma acoplado indutivamente axialmente (AVICP-AES).	200.5, Revisão 4.2. ²				
	Absorção Atômica; Direta ..			3111 B	3111 B	
	Absorção Atômica; Forno .			3113 B	3113 B	3113 B-04, B-10
	Plasma Acoplado Indutivamente			3120 B	3120 B	
Sulfato	Cromatografia Iônica		D 4327-11	4110 B	4110 B	
	Gravimétrico com ignição de resíduo			4500-S04 2º C		4500-S04 2º C-97.
	Gravimétrico com secagem de resíduo.			4500-S04 2º D		4500-S04 2º D-97.
	Método turbidimétrico		D 516-07, 11, 16.	4500-S04 2º E.		4500-S04 2º E-97.
	Método automatizado do azul de metilimol			4500-S04 2º F.		4500-S04 2º F-97.
Sólidos totais dissolvidos	Sólidos totais dissolvidos secos a 180°C			2540 C		
Zinco	Visão Axial de Emissão Atômica de Plasma Acoplado Indutivamente	200.5, Revisão 4.2. ²				
	por espectrometria (AVICP-AES).					
	Absorção Atômica; Aspiração Direta			3111 B		
	Plasma Acoplado Indutivamente			3120 B		

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designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

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* * * * *

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IDEXX Summary

5GC



Topic Colilert*, Colilert-18, Colisure*, Enterolert*, Quanti-Tray* and Quanti-Tray/2000 included in *Standard Methods for the Examination of Water and Wastewater* (23rd Edition) are incorporated as approved methods in the US EPA 40 CFR Part 141, drinking water.

Title Expedited Approval of Alternative Test Procedures for the Analysis of Contaminates Under the Safe Drinking Water Act; Analysis and Sampling Procedures

Source US Environmental Protection Agency, Federal Register Volume 83, No. 198; 40 CFR Part 141

Date October 12, 2018

Highlights

- The US EPA used the expedited approach to authorize 100 additional methods, for analyzing drinking water samples collected under the Safe Drinking Water Act, which are listed in 40 CFR 141 Appendix A to subpart C.
- The EPA concluded 89 methods from *Standard Methods for the Examination of Water and Wastewater* (*Standard Methods*), 23rd edition, published in July 2017, are equally effective relative to the promulgated versions in the regulations.
- EPA has again approved *Standard Methods* for Colilert, Colilert-18, Colisure, Quanti-Tray and Quanti-Tray/2000, included in *Standard Methods*, 23rd Edition (IDEXX Summary 5L-v4), which has been incorporated in 40 CFR 141.74(a)1 and 40 CFR 141.852(a)(5) for total coliforms and 40 CFR 141.402(c)(2) and 40 CFR 141.852(a)(5) for *E. coli*.
- Enterolert, included in *Standard Methods*, 23rd Edition (IDEXX Summary 5CK-v2) has been incorporated in 40 CFR 141.402 (c)(2) for enterococcus detection.
- A copy of the expedited approval is attached or can be viewed at <https://www.regulations.gov/> website under Docket ID No. EPA-HQ-OW-2018-0558, or viewed here: <https://www.federalregister.gov/documents/2018/10/12/2018-22162/expedited-approval-of-alternative-test-procedures-for-the-analysis-of-contaminants-under-the-safe>

*Colilert, Colisure, Enterolert, and Quanti-Tray are a trademark or registered trademark of IDEXX Laboratories, Inc. or its affiliates in the United States and/or other countries

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agencies with more timely access to new measurement techniques and greater flexibility in the selection of analytical methods, thereby reducing monitoring costs while maintaining public health protection.

DATES: This action is effective October 12, 2018.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA-HQ-OW-2018-0558. All documents in the docket are listed on the <https://www.regulations.gov/> Website. Although listed in the index, some information is not publicly available, e.g., confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the internet and will be publicly available only in hard copy form. Publicly available docket materials are

available electronically through <https://www.regulations.gov/>.

FOR FURTHER INFORMATION CONTACT: Glynda Smith, Technical Support Center, Standards and Risk Management Division, Office of Ground Water and Drinking Water (MS 140), Environmental Protection Agency, 26 West Martin Luther King Drive, Cincinnati, Ohio 45268; telephone number: (513) 569-7652; email address: smith.glynda@epa.gov.

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does this action apply to me?

Public water systems are the regulated entities required to measure contaminants in drinking water samples. The EPA Regions as well as states and tribal governments with authority to administer the regulatory program for public water systems under

the Safe Drinking Water Act (SDWA) may also measure contaminants in water samples. When the EPA sets a monitoring requirement in its national primary drinking water regulations for a given contaminant, the Agency also establishes (in the regulations) standardized test procedures for analysis of the contaminant. This action makes alternative testing methods available for particular drinking water contaminants beyond the testing methods currently established in the regulations. The EPA is providing public water systems, required to test water samples, with a choice of using either a test procedure already established in the existing regulations or an alternative testing method that has been approved in this action or in prior expedited approval actions. Categories and entities that may ultimately be interested in this expedited methods approval action include:

Category	Examples of potentially regulated entities	NAICS ¹
State, local, & tribal governments	State, local, and tribal governments that analyze water samples on behalf of public water systems required to conduct such analysis; state, local, and tribal governments that directly operate community and non-transient non-community water systems required to monitor.	924110
Industry	Private operators of community and non-transient non-community water systems required to monitor.	221310
Municipalities	Municipal operators of community and non-transient non-community water systems required to monitor.	924110

¹ North American Industry Classification System.

This table is not intended to be exhaustive, but rather provides the EPA's guide for readers regarding entities likely to be interested in this action. Other types of entities not listed in the table may also have some interest. To determine whether this action may concern your facility, you should carefully examine the applicability language in the *Code of Federal Regulations* (CFR) at 40 CFR 141.2 (definition of a public water system). If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

Abbreviations and Acronyms Used in This Action

- APHA: American Public Health Association
- ATP: Alternate Test Procedure
- CBI: Confidential Business Information
- CFR: *Code of Federal Regulations*
- EPA: U.S. Environmental Protection Agency
- NAICS: North American Industry Classification System
- QC: Quality Control
- QCS: Quality Control Sample
- SDWA: The Safe Drinking Water Act

- SM: Standard Method
- VCSB: Voluntary Consensus Standard Bodies

II. Background

A. What is the purpose of this action?

In this action, the EPA is approving 100 analytical methods for determining contaminant concentrations in drinking water samples collected under the SDWA. Regulated entities required to sample and monitor may use either the testing methods already established in existing national primary drinking water regulations or the alternative testing methods being approved under this action or in prior expedited approval actions. The new methods are listed along with other methods similarly approved through previous expedited actions in 40 CFR part 141, Appendix A to subpart C and on the EPA's drinking water methods website at <https://www.epa.gov/dwanalyticalmethods>.

B. What is the basis for this action?

When the EPA determines that an alternative analytical method is "equally effective" (i.e., as effective as a method that has already been promulgated in the regulations), the

SDWA allows the EPA to approve the use of the alternative testing method through publication in the **Federal Register** (see section 1401(1) of the SDWA). The EPA is using this approval authority to make 100 additional methods available for determining contaminant concentrations in drinking water samples collected under the SDWA. The EPA has determined that, for each contaminant or group of contaminants listed in Section III of this action, the additional testing methods being approved are as effective as one or more of the testing methods already approved in the regulations for those contaminants. Section 1401(1) of the SDWA states that the newly approved methods "shall be treated as an alternative for public water systems to the quality control and testing procedures listed in the regulation." Accordingly, this action makes these additional 100 analytical methods legally available as options for meeting the EPA's monitoring requirements.

This action does not add regulatory language; however, for informational purposes, the action updates an appendix to the regulations at 40 CFR part 141, which lists all methods

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approved under section 1401(1) of the SDWA. Accordingly, while this action is not a rule, it is updating CFR text and therefore is being published under the "Final Rules" section of the Federal Register.

III. Summary of Approvals

The EPA is approving 100 methods that are equally effective relative to methods previously promulgated in the regulations. This action adds these 100 methods to Appendix A to subpart C of 40 CFR part 141.

A. Methods Developed by the EPA

1. EPA Method 900.0, Revision 1.0, Determination of Gross Alpha and Gross Beta in Drinking Water (USEPA 2018). EPA Method 900.0 (USEPA 1980) was promulgated in the drinking water regulations at 40 CFR 141.25(a) as a screening method for alpha- and beta-emitting radionuclides. EPA Method 900.0, Revision 1.0 was developed in response to comments from radiochemistry stakeholders indicating that the older, approved method does not address newer instrumental capabilities such as simultaneous alpha/beta counting and the concomitant need to properly address crosstalk. Moreover, stakeholders requested that a method revision provide more in-depth calibration details and quality control criteria to assure a more robust procedure capable of yielding improved consistency in generating and evaluating analytical results. EPA Method 900.0, Revision 1.0 addresses those concerns and also corrects specific disparities between requirements in the promulgated Method 900.0 and the

criteria defined in the regulations. For example, the approved Method 900.0 defines americium-241 as the gross alpha calibrant. However, americium-241 is not approved in the regulations at 40 CFR 141.25(a); footnote 11 to the table at 40 CFR 141.25(a) states that only natural uranium and thorium-230 are approved calibration standards for gross alpha evaporative methods (i.e., Method 900.0). Americium-241 is only approved as an alpha calibrant for co-precipitation methods.

The revised method also addresses the important issue of the time interval involved between sample preparation and counting. Timing events can have a significant impact on gross alpha results. The gross alpha maximum contaminant level specified at 40 CFR 141.66(c) is 15 pCi/L and excludes radon and uranium activity. The promulgated method specifies a minimum 72-hour hold time after preparation before counting the samples. Such a delay can allow radon ingrowth along with its alpha-emitting progeny. The revised method eliminates the hold time in order to more accurately meet the intent of the gross alpha maximum contaminant level specification.

The EPA has determined that EPA Method 900.0, Revision 1.0 is equally as effective for determining gross alpha and gross beta radioactivity as the promulgated method. The basis for this determination is discussed in greater detail in Smith 2018a. Therefore, the EPA is approving EPA Method 900.0, Revision 1.0 for the routine determination of gross alpha and gross beta radioactivity in drinking water.

EPA Method 900.0 Rev 1.0 is available at the National Service Center for Environmental Publications.

B. Methods Developed by Voluntary Consensus Standard Bodies (VCSB)

1. Standard Methods for the Examination of Water and Wastewater (Standard Methods). The 23rd edition of *Standard Methods for the Examination of Water and Wastewater* (APHA 2017) was published in July 2017. The EPA compared 89 methods in the 23rd edition to earlier versions of those methods that are promulgated in 40 CFR parts 141 and 143. Changes between the promulgated version and the version of each method published in the 23rd edition are summarized in Smith and Wendelken (2018) and Best (2018). The revisions primarily involve editorial changes (e.g., correction of errors, procedural clarifications, and reorganization of text). Errors in the nitrate methods (4500-NO₃ D, E, and F) have been addressed in an appropriate errata sheet prepared for the 23rd edition (APHL 2018). The methods in the following table are the same as the earlier approved versions with respect to the sample handling protocols, analytical procedures, and method performance data. For these reasons, the EPA has concluded that the versions in the 23rd edition are equally effective relative to the promulgated versions in the regulations. Therefore, the EPA is approving the use of 89 Standard Methods in the 23rd edition for the contaminants and their respective regulations listed in the following table:

Standard methods, 23rd edition (APHA 2017)	Approved method	Contaminant	Regulation citations
2120 B	2120 B-01, online version (APHA 2001a).	Color	40 CFR 143.4(b).
2130 B	2130 B-01, online version (APHA 2001b).	Turbidity	40 CFR 141.74(a)(1).
2150 B	2150 B-97, online version (APHA 1997a).	Odor	40 CFR 143.4(b).
2320 B	2320 B-97, online version (APHA 1997b).	Alkalinity	40 CFR 141.23(k)(1).
2510 B	2510 B-97, online version (APHA 1997c).	Conductivity	40 CFR 141.23(k)(1).
2540 C	2540 C-97, online version (APHA 1997d).	Total Dissolved Solids	40 CFR 143.4(b).
2550	2550-00, online version (APHA 2000a)	Temperature	40 CFR 141.23(k)(1).
3111 B	3111 B-99, online version (APHA 1999a).	Calcium, copper, magnesium, nickel, sodium, iron, manganese, silver, zinc.	40 CFR 141.23(k)(1); 40 CFR 143.4(b).
3111 D	3111 D-99, online version (APHA 1999a).	Barium, aluminum	40 CFR 141.23(k)(1); 40 CFR 143.4(b).
3112 B	3112 B-99, online version (APHA 1999b).	Mercury	40 CFR 141.23(k)(1).



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Standard methods, 23rd edition (APHA 2017)	Approved method	Contaminant	Regulation citations
3113 B	3113 B, 19th Edition (APHA 1995)	Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, selenium, aluminum, iron, manganese, silver.	40 CFR 141.23(k)(1); 40 CFR 143.4(b).
3114 B	3114 B-97, online version (APHA 1997e).	Arsenic, selenium	40 CFR 141.23(k)(1).
3120 B	3120 B-99, online version (APHA 1999c).	Barium, beryllium, calcium, chromium, copper, magnesium, nickel, silica, aluminum, iron, manganese, silver, zinc.	40 CFR 141.23(k)(1); 40 CFR 143.4(b).
3500-Ca B	3500-Ca B-97, online version (APHA 1997f).	Calcium	40 CFR 141.23(k)(1).
3500-Mg B	3500-Mg B-97, online version (APHA 1997g).	Magnesium	40 CFR 141.23(k)(1).
4110 B	4110 B-00, online version (APHA 2000b).	Fluoride, nitrate, nitrite, ortho-phosphate, chloride, sulfate.	40 CFR 141.23(k)(1); 40 CFR 143.4(b).
4500-Cl D, F, G, H	4500-Cl D, F, G, H-00, online versions (APHA 2000c).	Free chlorine	40 CFR 141.74(a)(2); 40 CFR 141.131(c)(1).
4500-Cl D, E, F, G, I	4500-Cl D, E, F, G, I-00, online versions (APHA 2000c).	Total chlorine	40 CFR 141.74(a)(2); 40 CFR 141.131(c)(1).
4500-Cl D, F, G	4500-Cl D, F, G-00, online versions (APHA 2000c).	Combined chlorine	40 CFR 141.131(c)(1).
4500-Cl ³⁺ B, D	4500-Cl ³⁺ B, D-97, online versions (APHA 1997h).	Chloride	40 CFR 143.4(b).
4500-ClO ₂ C	4500-ClO ₂ C-00, online version (APHA 2000d).	Chlorine dioxide	40 CFR 141.74(a)(2).
4500-ClO ₂ E	4500-ClO ₂ E-00, online version (APHA 2000d).	Chlorine dioxide	40 CFR 141.74(a)(2); 40 CFR 141.131(c)(1).
4500-ClO ₂ E	4500-ClO ₂ E-00, online version (APHA 2000d).	Chlorite	40 CFR 141.131(b)(1).
4500-CN ³⁻ C, E, F, G	4500-CN ³⁻ , 20th Edition (APHA 1998)	Cyanide	40 CFR 141.23(k)(1).
4500-F ²⁻ B, C, D, E	4500-F ²⁻ B, C, D, E-97, online versions (APHA 1997i).	Fluoride	40 CFR 141.23(k)(1).
4500-H+B	4500-H+ B-00, online version (APHA 2000e).	pH	40 CFR 141.23(k)(1).
4500-NQ ³⁺ * D	4500-NQ ³⁺ * D-00, online version (APHA 2000f).	Nitrate	40 CFR 141.23(k)(1).
4500-NQ ³⁺ * E, F	4500-NQ ³⁺ * E, F-00, online versions (APHA 2000f).	Nitrate, nitrite	40 CFR 141.23(k)(1).
4500-NQ ³⁺ * B	4500-NQ ³⁺ * B-00, online version (APHA 2000g).	Nitrite	40 CFR 141.23(k)(1).
4500-O ₃ B	4500-O ₃ B-97, online version (APHA 1997j).	Ozone	40 CFR 141.74(a)(2).
4500-P E, F	4500-P E, F, 19th Edition, (APHA 1995).	Ortho-phosphate	40 CFR 141.23(k)(1).
4500-SiO ₂ C, D, E	4500-SiO ₂ C, D, E-97, online versions (APHA 1997k).	Silica	40 CFR 141.23(k)(1).
4500-SO ₄ ²⁻ C, D, E, F	4500-SO ₄ ²⁻ C, D, E, F, 19th Edition (APHA 1995).	Sulfate	40 CFR 143.4(b).
5310 B, C	5310 B, C-00, online versions (APHA 2000h).	Dissolved and Total Organic Carbon ...	40 CFR 141.131(d).
5540 C	5540 C-00, online version (APHA 2000i).	Foaming agents	40 CFR 143.4(b).
5910 B	5910 B-00, online version (APHA 2000j).	UV Absorption at 254 nm	40 CFR 141.131(d).
6251 B	6251 B-94, online version (APHA 1994).	HAA5	40 CFR 141.131(b)(1).
6610 B	EPA Method 531.2, Rev. 1.0 (USEPA 2001).	Carbofuran, oxamyl	40 CFR 141.24(e)(1).
6640 B	EPA Method 515.4, Rev. 1.0 (USEPA 2000).	2,4-D; 2,4,5-TP; Dalapon; Dinoseb; Pentachlorophenol; Picloram.	40 CFR 141.24(e)(1).
6651 B	6651 B, 20th Edition, (APHA 1998)	Glyphosate	40 CFR 141.24(e)(1).
7110 B	7110 B-00, online version (APHA 2000k).	Gross alpha and gross beta	40 CFR 141.25(a).
7110 C	7110 C-00, online version (APHA 2000k).	Gross alpha	40 CFR 141.25(a).
7120	7120-97, online version (APHA 1997l).	Gamma emitters (includes radioactive cesium and iodine).	40 CFR 141.25(a).
7500-Cs B	7500-Cs B-00, online version (APHA 2000l).	Radioactive Cesium and Gamma emitters.	40 CFR 141.25(a).



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Standard methods, 23rd edition (APHA 2017)	Approved method	Contaminant	Regulation citations
7500-H B	7500-H B-00, online version (APHA 2000m).	Tritium	40 CFR 141.25(a).
7500-I B	7500-I B-00, online version (APHA 2000n).	Radioactive Iodine and Gamma emitters.	40 CFR 141.25(a).
7500-I C, D	7500-I C, D-00, online versions (APHA 2000n).	Radioactive Iodine	40 CFR 141.25(a).
7500-Ra B, C	7500-Ra B, C-01, online versions (APHA 2001c).	Radium-226	40 CFR 141.25(a).
7500-Ra D	7500-Ra D-01, online version (APHA 2001c).	Radium-228	40 CFR 141.25(a).
7500-Ra E	GA Method (2004)	Radium-226 and Radium-228	40 CFR 141.25(a).
7500-Sr B	7500-Sr B-01, online version (APHA 2001d).	Strontium-89 and Strontium-90	40 CFR 141.25(a).
7500-U B, C	7500-U B, C-00, online versions (APHA 2000o).	Uranium	40 CFR 141.25(a).
9221 A, C	9221 A, C, 20th Edition, (APHA 1998)	Total coliforms	40 CFR 141.74(a)(1).
9221 B	9221 B, 20th Edition, (APHA 1998)	Total coliforms	40 CFR 141.74(a)(1); 40 CFR 141.852(a)(5) [B.1, B.2, B.3, B.4].
9221 D	9221 D, 20th Edition, (APHA 1998)	Total coliforms	40 CFR 141.852(a)(5) [D.1, D.2, D.3].
9221 E	9221 E, 20th Edition, (APHA 1998)	Fecal coliforms	40 CFR 141.74(a)(1).
9221 F	9221 F, 20th Edition, (APHA 1998)	<i>E. coli</i>	40 CFR 141.402(c)(2); 40 CFR 141.852(a)(5) [F.1].
9222 A	9222 A 20th Edition, (APHA 1998)	Total coliforms	40 CFR 141.74(a)(1).
9222 B, C	9222 B, C, 20th Edition, (APHA 1998)	Total coliforms	40 CFR 141.74(a)(1); 40 CFR 141.852(a)(5).
9222 D	9222 D, 20th Edition, (APHA 1998)	Fecal coliforms	40 CFR 141.74(a)(1).
9222 H	9222 G, 20th Edition, (APHA 1998)	<i>E. coli</i>	40 CFR 141.852(a)(5).
9222 I	9222 G, 20th Edition, (APHA 1998)	<i>E. coli</i>	40 CFR 141.402(c)(2); 40 CFR 141.852(a)(5).
9222 J	m-ColiBlue24 Test (Hach Company 1999).	Total coliforms	40 CFR 141.852(a)(5).
9222 J	m-ColiBlue24 Test (Hach Company 1999).	<i>E. coli</i>	40 CFR 141.402(c)(2); 40 CFR 141.852(a)(5).
9223 B	9223 B, 20th Edition (APHA 1998)	Total coliforms	40 CFR 141.74(a)(1); 40 CFR 141.852(a)(5).
9223 B	9223 B, 20th Edition (APHA 1998)	<i>E. coli</i>	40 CFR 141.402(c)(2); 40 CFR 141.852(a)(5).
9215 B	9215 B, 20th Edition (APHA 1998)	Heterotrophic bacteria	40 CFR 141.74(a)(1).
9230 C	9230 C, 20th Edition (APHA 1998) (Budnick 1996)	Enterococci	40 CFR 141.402(c)(2).
		Enterococci	40 CFR 141.402(c)(2).



Two additional methods from earlier editions of *Standard Methods for the Examination of Water and Wastewater* are being approved under this action: Standard Method 4500-CN[∞] C in the 21st edition (APHA 2005) and Standard Method 4500-CN[∞] C in the 22nd edition (APHA 2012). Also, the identical online version, Standard Method 4500-CN[∞] C-99 (APHA 1999d) is being approved. The originally approved method, Standard Method 4500-CN[∞] C in the 20th edition (APHA 1998) specified addition of magnesium chloride in the distillation. Beginning with the 1999 online method, and in the subsequent 21st and 22nd editions, Standard Methods made the addition of magnesium chloride optional, without providing supporting data to verify that distillation efficiency was not adversely affected when magnesium chloride was not used. As a result, the EPA did not approve Standard Method 4500-CN[∞] C in the 1999 online method and subsequent editions of *Standard*

Methods for the Examination of Water and Wastewater. The distillation performed in Standard Method 4500-CN[∞] C is required prior to conducting the analyses for all of the other approved cyanide methods. As a result, laboratories conducting cyanide analyses for drinking water compliance have had to rely on the approved version in the 20th edition. That may result in confusion because laboratories that also conduct cyanide analyses for wastewaters use the more recently published Standard Methods. In order to address this issue, the EPA is approving Standard Method 4500-CN[∞] C in the editions and online version as stated above, but with the requirement to add magnesium chloride in the distillation. The cyanide entry in Appendix A to subpart C of part 141 has been revised to clarify this requirement.

The 23rd edition can be obtained from the American Public Health Association (APHA), 800 I Street NW, Washington, DC 20001-3710. Approved online

versions are available at <http://www.standardmethods.org>.

2. ASTM International. The EPA compared the most recent versions of five ASTM International methods to the earlier versions of those methods that are promulgated in 40 CFR part 141. Most of the changes in the updated versions include additional quality control specifications.

Changes between the earlier approved version and the most recent version of each method are described more fully in Smith (2018b). Besides additional quality control, the revisions involve (primarily) editorial changes (e.g., updated references, definitions, terminology, procedural clarifications, and reorganization of text). The revised methods are the same as the promulgated versions with respect to sample collection and handling protocols, sample preparation, analytical methodology, and method performance data; thus, the EPA finds



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that they are equally effective relative to the promulgated methods.

The EPA is thus approving the use of the following ASTM International methods for the contaminants and their

respective regulations listed in the following table:

ASTM revised version	Approved method	Contaminant	Regulation citations
D 516-16 (ASTM 2016a)	D 516-02 (ASTM 2002a)	Sulfate	40 CFR 143.4(b).
D 859-16 (ASTM 2016b)	D 859-00 (ASTM 2000)	Silica	40 CFR 141.23(k)(1).
D 1067-16 B (ASTM 2016c)	D 1067-02 B (ASTM 2002b)	Alkalinity	40 CFR 141.23(k)(1).
D 1179-16 B (ASTM 2016d)	D 1179-99 B (ASTM 1999)	Fluoride	40 CFR 141.23(k)(1).
D 5673-16 (ASTM 2016e)	D 5673-03 (ASTM 2003)	Uranium	40 CFR 141.25(a).



The ASTM methods are available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or <http://www.astm.org>.

C. Methods Developed by Vendors

1. Hach Method 10258, Rev. 2.0. *Determination of Turbidity by 360° Nephelometry*, March 2018 (Hach Company 2018a). In July 2016, Hach Method 10258, Rev. 1.0 (Hach Company 2016) was approved in an expedited methods approval action (USEPA 2016) as an equally effective alternate method to the Hach FilterTrak Method 10133 (Hach Company 2000), which is approved at 40 CFR 141.74(a)(1), for determination of turbidity in drinking water.

Turbidimeter calibration and calibration verification have remained unchanged since promulgation of turbidity methods in 40 CFR 141.74(a)(1). Calibration and quarterly calibration validation through analysis of a Quality Control Sample (QCS) require preparation of a primary calibration standard. Sealed standards are considered as secondary calibration standards and used only as calibration verification checks between the quarterly calibration validation QCS evaluations.

Public water systems utilize multiple turbidimeters and many of the units are in line with process streams. The time and cost associated with preparing quarterly primary calibration standards can be significant. In 2016, Hach Company began to manufacture glass flame-sealed vials prefilled with StablCal™, which is an approved primary calibration standard. From December 2016 through March 2018, Hach conducted a long-term stability study with a set of sealed vials containing StablCal to determine whether the integrity of the vials and stability of the primary calibration standard could be maintained. After 515 days (1.4 years), the sealed StablCal primary calibration standards exhibited a %bias of <0.1% and relative standard deviation of 0.7% compared to the initial certified turbidity values, indicating that no degradation of the

StablCal primary calibration standard occurred. The results of this study are discussed further in the validation report (Hach Company 2018b).

Hach Method 10258, Rev. 2.0 is an updated version of the promulgated Hach Method 10258, Rev. 1.0. The updated method provides for use of glass flame-sealed vials prefilled with StablCal as primary calibration standards, secondary calibration verification standards, and QCS checks. The EPA has determined that Hach Method 10258, Rev. 2.0 is equally as effective as the promulgated Hach Method 10258, Rev. 1.0. The basis for this determination is discussed in Adams and Smith (2018). Therefore, the EPA is approving Hach Method 10258, Rev. 2.0 for the determination of turbidity in drinking water. Hach Method 10258, Rev. 2.0 can be obtained from Hach Company, 5600 Lindbergh Drive, P.O. Box 389, Loveland, Colorado 80539.

2. Hach Method 8195, Rev. 3.0. *Determination of Turbidity by Nephelometry*, March 2018 (Hach Company 2018c). On April 20, 1998, the EPA Office of Water issued a letter (USEPA 1998) addressing the use of Hach Method 8195 (Hach Company 1997) as an alternate method to EPA Method 180.1 (USEPA 1993) for drinking water compliance monitoring of turbidity. Hach Method 8195 established the same requirements for primary calibration standards, secondary calibration verification standards, and QCS checks as described for Hach Method 10258, Rev. 1.0 in Section III.C.1 of this action. Hach Method 8195, Rev. 3.0 is an updated version of the 1997 Hach Method 8195. The updated method provides for use of glass flame-sealed vials prefilled with StablCal as primary calibration standards, secondary calibration verification standards, and QCS checks. The EPA has determined that Hach Method 8195, Rev. 3.0 is equally as effective as the 1997 Hach Method 8195 and EPA Method 180.1. The basis for this determination is discussed in Adams and Smith (2018). Therefore, the EPA is approving Hach Method 8195,

Rev. 3.0 for the determination of turbidity in drinking water. Hach Method 8195, Rev. 3.0 can be obtained from Hach Company, 5600 Lindbergh Drive, P.O. Box 389, Loveland, Colorado 80539.

IV. Statutory and Executive Order Reviews

As noted in Section II of this action, under the terms of the SDWA, section 1401(1), this streamlined method approval action is not a rule. Accordingly, the Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, does not apply because this action is not a rule for purposes of 5 U.S.C. 804(3). Similarly, this action is not subject to the Regulatory Flexibility Act because it is not subject to notice and comment requirements under the Administrative Procedure Act or any other statute. In addition, because this approval action is not a rule, but simply makes alternative testing methods available as options for monitoring under the SDWA, the EPA has concluded that other statutes and executive orders generally applicable to rulemaking do not apply to this approval action.

V. References

Adams and Smith. 2018. Memo to the record describing basis for expedited approval of Hach Company Methods 10258, Rev. 2.0 and 8195, Rev. 3.0. July 29, 2018. (Available at <http://www.regulations.gov>; docket ID No. EPA-HQ-OW-2018-0558.)

American Public Health Association (APHA). 1994. Standard Method 6251 B-94. Disinfection By-Products: Haloacetic Acids and Trichlorophenol. B. Micro Liquid-Liquid Extraction Gas Chromatographic Method. Approved by Standard Methods Committee 1994. Standard Methods Online (Available at <http://www.standardmethods.org>)

American Public Health Associate (APHA). 1995. *19th Edition of Standard Methods for the Examination of Water and Wastewater*. American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

American Public Health Association (APHA). 1997a. Standard Method 2150 B-97.





- Odor. B. Threshold Odor Test. Approved by Standard Methods Committee 1997. Standard Methods Online (Available at <http://www.standardmethods.org>)
- American Public Health Association (APHA). 1997b. Standard Method 2320 B-97. Alkalinity. B. Titration Method. Approved by Standard Methods Committee 1997. Standard Methods Online (Available at <http://www.standardmethods.org>)
- American Public Health Association (APHA). 1997c. Standard Method 2510 B-97. Conductivity. B. Laboratory Method. Approved by Standard Methods Committee 1997. Standard Methods Online (Available at <http://www.standardmethods.org>)
- American Public Health Association (APHA). 1997d. Standard Method 2540 C-97. Solids. C. Total Dissolved Solids Dried at 180 °C. Approved by Standard Methods Committee 1997. Standard Methods Online (Available at <http://www.standardmethods.org>)
- American Public Health Association (APHA). 1997e. Standard Method 3114 B-97. Arsenic and Selenium by Hydride Generation/Atomic Emission Spectrometry. B. Manual Hydride Generation/Atomic Absorption Spectrometric Method. Approved by Standard Methods Committee 1997. Standard Methods Online (Available at <http://www.standardmethods.org>)
- American Public Health Association (APHA). 1997f. Standard Method 3500-Ca B-97. Calcium. B. EDTA Titrimetric Method. Approved by Standard Methods Committee 1997. Standard Methods Online (Available at <http://www.standardmethods.org>)
- American Public Health Association (APHA). 1997g. Standard Method 3500-Mg B-97. Magnesium. B. Calculation Method. Approved by Standard Methods Committee 1997. Standard Methods Online (Available at <http://www.standardmethods.org>)
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List of Subjects in 40 CFR Part 141

Environmental protection, Chemicals, Indians-lands, Intergovernmental relations, Reporting and recordkeeping requirements, Water supply.

Dated: September 28, 2018.

Peter Grevatt,
Director, Office of Ground Water and Drinking Water.

For the reasons stated in the preamble, the Environmental Protection Agency amends 40 CFR part 141 as follows:

PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

■ 1. The authority citation for part 141 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, 300j-9, and 300j-11.

■ 2. Amend Appendix A to subpart C of part 141 as follows:

■ a. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.23(k)(1)."

- b. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.24(e)(1)."
- c. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.25(a)."
- d. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.74(a)(1)."
- e. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.74(a)(2)."
- f. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.131(b)(1)."
- g. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.131(c)(1)."
- h. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR PARAMETERS LISTED AT 40 CFR 141.131(d)."
- i. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.402(c)(2)."
- j. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.852(a)(5)."
- k. Revise the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 143.4(b)."
- l. Revise footnotes 9, 14, 16, 18, 22-23, 25-26, 29, 31, 34-39, and 48.
- m. Add footnotes 49-52.
- The revisions and additions read as follows:

Appendix A to Subpart C of Part 141—Alternative Testing Methods Approved for Analyses Under the Safe Drinking Water Act

* * * * *

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.23(k)(1)

Contaminant	Methodology	EPA method	SM 21st edition ¹	SM 22nd edition ^{2*}	SM 23rd edition ^{3*}	SM Online ³	ASTM ⁴	Other
Alkalinity	Titrimetric		2320 B	2320 B	2320 B		D1067-06 B, 11 B, 16 B	
Antimony	Hydride—Atomic Absorption						D 3697-07, -12	
	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10		
Arsenic	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2 ²						
	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10, 3114 B-09	D 2972-08 C, -15 C	D 2972-08 B, -15 B.
Barium	Hydride Atomic Absorption		3114 B	3114 B	3114 B			
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2 ²						
Barium	Inductively Coupled Plasma		3120 B	3120 B	3120 B			
	Atomic Absorption; Direct		3111 D	3111 D	3111 D			



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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.23(k)(1)—Continued

Contaminant	Methodology	EPA method	SM 21st edition ¹	SM 22nd edition ^{2a}	SM 23rd edition ^{2b}	SM Online ³	ASTM ⁴	Other
Beryllium	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10		
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 ²						
Cadmium	Inductively Coupled Plasma Atomic Absorption; Furnace		3120 B 3113 B	3120 B 3113 B	3120 B 3113 B	3113 B-04, B-10	D 3645-08 B, -15 B	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 ²						
Calcium	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10		
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 ²						
Chromium	EDTA titrimetric		3500-Ca B	3500-Ca B	3500-Ca B		D 5111-09, -14 A	
	Atomic Absorption; Direct Aspiration Inductively Coupled Plasma		3111 B 3120 B	3111 B 3120 B	3111 B 3120 B		D 5111-09, -14 B	
Copper	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 ²						
	Ion Chromatography Inductively Coupled Plasma Atomic Absorption; Furnace		3120 B 3113 B	3120 B 3113 B	3120 B 3113 B	3113 B-04, B-10	D 6919-09	
Conductivity	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 ²						
	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10	D 1688-07, -12 C	
Cyanide	Atomic Absorption; Direct Aspiration Inductively Coupled Plasma		3111 B 3120 B	3111 B 3120 B	3111 B 3120 B		D 1688-07, -12 A	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES) Colorimetry	200.5, Revision 4.2 ²						Hach Method 8026; ²⁵ Hach Method 10272. ²⁶
Fluoride	Conductance		2510 B	2510 B	2510 B		D 1125-14 A	
	Manual Distillation with MgCl ₂ followed by... Spectrophotometric, Amenable		4500-CN ¹ C	4500-CN ¹ C	4500-CN ¹ C	4500-CN ¹ C-99	D 2036-06 A	
Lead	Spectrophotometric Manual Selective Electrode		4500-CN ¹ G 4500-CN ¹ E 4500-CN ¹ F	4500-CN ¹ G 4500-CN ¹ E 4500-CN ¹ F	4500-CN ¹ G 4500-CN ¹ E 4500-CN ¹ F		D 2036-06 B D 2036-06 A	
	Gas Chromatography/Mass Spectrometry Headspace							ME355.01. ²⁷
Magnesium	Ion Chromatography Manual Distillation; Colorimetric SPADNS		4110 B 4500-F ¹ B, D 4500-F ¹ C	4110 B 4500-F ¹ B, D 4500-F ¹ C	4110 B 4500-F ¹ B, D 4500-F ¹ C		D 4327-11 D 1179-04, 10 B, 16 B	
	Automated Alizarin Arsenite-Free Colorimetric SPADNS		4500-F ¹ E	4500-F ¹ E	4500-F ¹ E			Hach SPADNS 2 Method 10225. ²⁸
Mercury	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10	D 3559-08 D, 15 D	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 ²						
Nickel	Atomic Absorption Inductively Coupled Plasma		3111 B 3120 B	3111 B 3120 B	3111 B 3120 B		D 5111-09, -14 B	
	Atomic Absorption; Direct Atomic Absorption; Furnace		3111 B 3113 B	3111 B 3113 B	3111 B 3113 B	3113 B-04, B-10	D 3223-12	
Nitrate	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 ²						
	Ion Chromatography Automated Cadmium Reduction		4110 B 4500-N ₃ ¹ F 4500-N ₃ ¹ E 4500-N ₃ ¹ D	4110 B 4500-N ₃ ¹ F 4500-N ₃ ¹ E 4500-N ₃ ¹ D	4110 B 4500-N ₃ ¹ F 4500-N ₃ ¹ E 4500-N ₃ ¹ D		D 4327-11	
Nitrite	Manual Cadmium Reduction							
	Ion Selective Electrode Reduction/Colorimetric							
Nitrite	Colorimetric; Direct							Systema Easy (1-Reagent); *NECI Nitrate-Reductase; ⁴⁰ Hach TNTplus™ 835/836 Method 10206. ²²
	Capillary Ion Electrophoresis Ion Chromatography		4110 B	4110 B	4110 B		D 6508-15 D 4327-11	



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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.23(k)(1)—Continued



Contaminant	Methodology	EPA method	SM 21st edition ¹	SM 22nd edition ^{2a}	SM 23rd edition ^{2b}	SM Online ³	ASTM ⁴	Other
Automated Cadmium Reduction	Automated Cadmium Reduction		4500-NQ ³	4500-NQ ³	4500-NQ ³			
	Manual Cadmium Reduction		F 4500-NQ ³	F 4500-NQ ³	F 4500-NQ ³			
	Spectrophotometric		E 4500-NQ ³	E 4500-NQ ³	E 4500-NQ ³			
	Reduction/Colorimetric		B.	B.	B			System Easy (1-Reagent); ⁵ NECl Nitrate-Reductase. ⁶
Ortho-phosphate	Capillary Ion Electrophoresis						D 6508-15	
	Ion Chromatography		4110 B	4110 B	4110 B		D 4327-11	
	Colorimetric, ascorbic acid, single reagent.		4500-P E	4500-P E	4500-P E	4500-P E-99		
pH	Colorimetric, Automated, Ascorbic Acid		4500-P F	4500-P F	4500-P F	4500-P F-99		Thermo Fisher Discrete Analyzer. ⁴¹
	Capillary Ion Electrophoresis						D 6508-15	
Selenium	Electrometric	150.3 ^{4a}	4500-H+ B	4500-H+ B	4500-H+ B		D 1293-12	
	Hydride-Atomic Absorption		3114 B	3114 B	3114 B	3114 B-09	D 3859-08 A, -15 A	
Silica	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10.	D 3859-08 B, -15 B	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2 ²						
	Colorimetric						D859-05, 10, 16	
	Molybdosilicate		4500-SiO ₂ C	4500-SiO ₂ C	4500-SiO ₂ C			
Sodium	Heteropoly blue		4500-SiO ₂ D	4500-SiO ₂ D	4500-SiO ₂ D			
	Automated for Molybdate-reactive Silica.		4500-SiO ₂ E	4500-SiO ₂ E	4500-SiO ₂ E			
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2 ²						
Temperature	Inductively Coupled Plasma		3120 B	3120 B	3120 B			
	Atomic Absorption; Direct Aspiration		3111 B	3111 B	3111 B			
Temperature	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2 ²						
	Ion Chromatography						D 6919-09	
	Thermometric		2550	2550	2550	2550-10		

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.24(e)(1)

Contaminant	Methodology	EPA method	SM 21st edition ¹	SM 22nd edition, ^{2a} SM 23rd edition ^{2b}	SM online ³
Benzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Carbon tetrachloride	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Chlorobenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,2-Dichlorobenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,4-Dichlorobenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,2-Dichloroethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
cis-Dichloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
trans-Dichloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Dichloromethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,2-Dichloropropane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Ethylbenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Styrene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Tetrachloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,1,1-Trichloroethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,1,1-Trichloroethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Trichloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Toluene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,2,4-Trichlorobenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,1-Dichloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
1,1,2-Trichloroethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Vinyl chloride	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
Xylenes (total)	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, ⁹ 524.4, ^{2a}			
2,4-D	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06.
2,4,5-TP (Silvex)	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06.
Alachlor	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3, ²⁴			
Atrazine	Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS).	536, ²⁵			
	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3, ²⁴	523, ²⁶		
Benzo(a)pyrene	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3, ²⁴			
Carbofuran	High-performance liquid chromatography (HPLC) with post-column derivatization and fluorescence detection.		6610 B	6610 B	6610 B-04.
Chlordane	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3, ²⁴			
Dalapon	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)	557, ¹⁴			



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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.24(e)(1)—Continued

Contaminant	Methodology	EPA method	SM 21st edition ¹	SM 22nd edition, ²⁸ SM 23rd edition ⁴⁹	SM online ³
Di(2-ethylhexyl)adipate.	Gas Chromatography/Electron Capture Detection (GC/ECD)	525.3. ²⁴	6640 B	6640 B	6640 B-01, B-06.
Di(2-ethylhexyl)phthalate.	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	6640 B	6640 B	6640 B-01, B-06.
Dibromochloropropane (DBCP).	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	524.3. ⁹	6640 B	6640 B	6640 B-01, B-06.
Dinoseb	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. ⁹	6640 B	6640 B	6640 B-01, B-06.
Endrin	Gas Chromatography/Electron Capture Detection (GC/ECD)	525.3. ²⁴	6640 B	6640 B	6640 B-01, B-06.
Ethyl dibromide (EDB)	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	524.3. ⁹	6651 B	6651 B	6651 B-00, B-05.
Glyphosate	Purge & Trap/Gas Chromatography/Mass Spectrometry	525.3. ²⁴	6651 B	6651 B	6651 B-00, B-05.
Heptachlor	High-Performance Liquid Chromatography (HPLC) with Post-Column Derivatization and Fluorescence Detection.	525.3. ²⁴	6610 B	6610 B	6610 B-04.
Heptachlor Epoxide ...	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	6610 B	6610 B	6610 B-04.
Hexachlorobenzene ...	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	6610 B	6610 B	6610 B-04.
Hexachlorocyclopentadiene.	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	6610 B	6610 B	6610 B-04.
Lindane	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	6610 B	6610 B	6610 B-04.
Methoxychlor	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	6610 B	6610 B	6610 B-04.
Oxamyl	High-performance liquid chromatography (HPLC) with post-column derivatization and fluorescence detection.	525.3. ²⁴	6610 B	6610 B	6610 B-04.
PCBs (as Aroclors) ...	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	6640 B	6640 B	6640 B-01, B-06.
Pentachlorophenol	Gas Chromatography/Electron Capture Detection (GC/ECD)	525.3. ²⁴	6640 B	6640 B	6640 B-01, B-06.
.....	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	6640 B	6640 B	6640 B-01, B-06.
Picloram	Gas Chromatography/Electron Capture Detection (GC/ECD)	525.3. ²⁴	6640 B	6640 B	6640 B-01, B-06.
Simazine	Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS).	525.3. ²⁴	523. ²⁶	523. ²⁶	523. ²⁶
.....	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	523. ²⁶	523. ²⁶	523. ²⁶
Toxaphene	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3. ²⁴	524.4. ²⁸	524.4. ²⁸	524.4. ²⁸
Total Trihalomethanes	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. ⁹	524.4. ²⁸	524.4. ²⁸	524.4. ²⁸



ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.25(a)

Contaminant	Methodology	EPA method	SM 21st edition ¹	SM 22nd edition, ²⁸ SM 23rd edition ⁴⁹	ASTM ⁴	SM Online ³
Naturally Occurring:						
Gross alpha and beta	Evaporation	900.0, Rev. 1.0 ⁵⁰ ...	7110 B	7110 B.	D 7283-17	7110 D-17.
Gross alpha	Liquid Scintillation .....	.....	7110 C	7110 C.	.....	.....
Radium 226	Coprecipitation .....	.....	7500-Ra C	7500-Ra C ...	D 3454-05.	.....
.....	Radiochemical .....	.....	7500-Ra B	7500-Ra B ...	D 2460-07.	.....
.....	Gamma Spectrometry .....	.....	7500-Ra D	7500-Ra E .....	.....	7500-Ra E-07.
Radium 228	Radiochemical .....	.....	7500-Ra D	7500-Ra D.	.....	.....
.....	Gamma Spectrometry .....	.....	7500-Ra D	7500Ra-E .....	.....	7500-Ra E-07.
Uranium	Radiochemical .....	.....	7500-U B	7500-U B.	.....	.....
.....	ICP-MS	3125	7500-U B	7500-U B.	D 5673-05, 10, 16.	.....
.....	Alpha spectrometry	7500-U C	7500-U C	7500-U C	D 3972-09.	.....
.....	Laser Phosphorimetry .....	.....	7500-U C	7500-U C	D 5174-07.	.....
.....	Alpha Liquid Scintillation Spectrometry.	.....	7500-U C	7500-U C	D 6239-09.	.....
Man-Made:						
Radioactive Cesium ...	Radiochemical .....	.....	7500-Cs B	7500-Cs B.	.....	.....
.....	Gamma Ray Spectrometry .....	.....	7120	7120	D 3649-06.	.....
Radioactive Iodine	Radiochemical .....	.....	7500-I B	7500-I B	D 3649-06.	.....
.....	.....	.....	7500-I C	7500-I C.	.....	.....
.....	.....	.....	7500-I D	7500-I D.	.....	.....
Radioactive Strontium 89, 90.	Gamma Ray Spectrometry .....	.....	7120	7120	D 4785-08.	.....
.....	Radiochemical .....	.....	7500-Sr B	7500-Sr B.	.....	.....
Tritium	Liquid Scintillation .....	.....	7500-3H B	7500-3H B ...	D 4107-08.	.....
Gamma Emitters	Gamma Ray	7120	7120	D 3649-06.
.....	Spectrometry	7500-Cs B	7500-Cs B ...	D 4785-08.
.....	7500-I B	7500-I B.



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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.74(a)(1)

Organism	Methodology	SM 21st edition ¹	SM 22nd edition ²⁸	SM 23rd edition ⁴⁹	SM Online ³	Other
Total Coliform	Total Coliform Fermentation Technique.	9221 A, B, C	9221 A, B, C	9221 A, B, C	9221 A,B,C-06.	
	Total Coliform Membrane Filter Technique.	9222 A, B, C		9222 A, B, C.		
Fecal Coliforms	ONPG-MUG Test	9223	9223 B	9223 B	9223 B-04.	
	Fecal Coliform Procedure.	9221 E	9221 E	9221 E	9221 E-06.	
Heterotrophic bacteria Turbidity	Fecal Coliform Filter Procedure.	9222 D	9222 D	9222 D	9222 D-06.	
	Pour Plate Method	9215 B	9215 B	9215 B	9215 B-04.	
	Nephelometric Method	2130 B	2130 B	2130 B		Hach Method 8195, Rev. 3.0. ⁵²
	Laser Nephelometry (on-line).					Mitchell M5271, ¹⁰ Mitchell M5331, Rev. 1.2, ⁴² Lovibond PTV 6000. ⁴⁶
	LED Nephelometry (on-line).					Mitchell M5331, ¹¹ Mitchell M5331, Rev. 1.2, ⁴² Lovibond PTV 2000. ⁴⁵
	LED Nephelometry (on-line).					AMI Turbiwell, ¹⁵ Lovibond PTV 1000. ⁴⁴
	LED Nephelometry (portable).					Orion AQ4500. ¹²
	360° Nephelometry					Hach Method 10258 Rev. 1.0, ³⁹ Hach Method 10258, Rev. 2.0. ⁵¹



ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.74(a)(2)

Residual	Methodology	SM 21st edition ¹	SM 22nd edition ²⁸ SM 23rd edition ⁴⁹	ASTM ⁴	Other
Free Chlorine	Amperometric Titration	4500-CI D	4500-CI D	D 1253-08, -14.	
	DPD Ferrous Titrimetric	4500-CI F	4500-CI F		Hach Method 10260. ³¹
	DPD Colorimetric	4500-CI G	4500-CI G		Hach Method 10241. ³⁴
	Indophenol Colorimetric				
	Syngaldazine (FACTS)	4500-CI H	4500-CI H		
Total Chlorine	On-line Chlorine Analyzer				EPA 334.0. ¹⁶
	Amperometric Sensor				ChloroSense. ¹⁷
Chlorine Dioxide	Amperometric Titration	4500-CI D	4500-CI D	D 1253-08, -14.	
	Amperometric Titration (Low level measurement).	4500-CI E	4500-CI E.		
	DPD Ferrous Titrimetric	4500-CI F	4500-CI F.		Hach Method 10260. ³¹
	DPD Colorimetric	4500-CI G	4500-CI G		
	Iodometric Electrode	4500-CI I	4500-CI I.		
	On-line Chlorine Analyzer				EPA 334.0. ¹⁶
Ozone	Amperometric Sensor				ChloroSense. ¹⁷
	Indigo Method	4500-O ₃ B	4500-O ₃ B.		Chloridiox Plus. ³²

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.131(b)(1)

Contaminant	Methodology	EPA method	ASTM ⁴	SM online ³	SM 21st edition ¹	SM 22nd edition ²⁸ SM 23rd edition ⁴⁹	Other
TTHM	P&T/GC/MS	524.3, ⁹ 524.4, ²⁹					
HAA5	LLE (diazomethane)/GC/ECD			6251 B-07	6251 B	6251 B.	
	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS).	557. ¹⁴					Thermo Fisher 557.1. ⁴⁷
Bromate	Two-Dimensional Ion Chromatography (IC) with Suppressed Conductivity Detection.						
	Two-Dimensional Ion Chromatography (IC).	302.0. ¹⁸					
	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS).	557. ¹⁴					
	Chemically Suppressed Ion Chromatography.		D 6581-08 A.				
	Electrolytically Suppressed Ion Chromatography.		D 6581-08 B.				



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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.131(b)(1)—Continued



Contaminant	Methodology	EPA method	ASTM 4	SM online 3	SM 21st edition 1	SM 22nd edition 28 SM 23rd edition 49	Other
Chlorite ...	Chemically Suppressed Ion Chromatography.	.....	D 6581-08 A.				
	Electrolytically Suppressed Ion Chromatography.	.....	D 6581-08 B.				
Chlorite—	daily monitoring as prescribed in 40 CFR 141.132(b)(2)(i)(A).	Amperometric Titration.	.....		4500-ClO ₂ E	4500-ClO ₂ E.	
	Amperometric Sensor .....	.....	.....				Chloridox Plus. ³²

ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.131(c)(1)

Residual	Methodology	SM 21st edition 1	SM 22nd edition 28 SM 23rd edition 49	ASTM 4	Other
Free Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08, -14.	
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F .....	.....	Hach Method 10260. ³¹
	DPD Colorimetric	4500-Cl G	4500-Cl G .....	.....	Hach Method 10241. ³⁴
	Indophenol Colorimetric .....	.....	.....	.....
	Syringaldazine (FACTS)	4500-Cl H	4500-Cl H.	.....
Combined Chlorine	Amperometric Sensor .....	.....	.....	.....	ChloroSense. ¹⁷
	On-line Chlorine Analyzer .....	.....	.....	.....	EPA 334.0. ¹⁶
	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08, -14.	
Total Chlorine	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F .....	.....
	DPD Colorimetric	4500-Cl G	4500-Cl G .....	.....	Hach Method 10260. ³¹
	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08, -14.	
	Low level Amperometric Titration.	4500-Cl E	4500-Cl E.	.....
Chlorine Dioxide	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F.	.....
	DPD Colorimetric	4500-Cl G	4500-Cl G .....	.....	Hach Method 10260. ³¹
	Iodometric Electrode	4500-Cl I	4500-Cl I.	.....
	Amperometric Sensor .....	.....	.....	.....	ChloroSense. ¹⁷
	On-line Chlorine Analyzer .....	.....	.....	.....	EPA 334.0. ¹⁶
	Amperometric Method II	4500-ClO ₂ E	4500-ClO ₂ E.	
	Amperometric Sensor	Chloridox Plus. ³²

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ALTERNATIVE TESTING METHODS FOR PARAMETERS LISTED AT 40 CFR 141.131(d)

Parameter	Methodology	SM 21st edition 1	SM 22nd edition 28	SM 23rd edition 49	SM online 3	EPA	Other
Total Organic Carbon (TOC) ...	High Temperature Combustion	5310 B	5310 B	5310 B .....	.....	415.3, Rev 1.2. ¹⁹	
	Persulfate-Ultraviolet or Heated Persulfate Oxidation.	5310 C	5310 C	5310 C .....	.....	415.3, Rev 1.2. ¹⁹	Hach Method 10267. ³⁶
	Wet Oxidation	5310 D	5310 D .....	.....	.....	415.3, Rev 1.2. ¹⁹	
Specific Ultraviolet Absorbance (SUVA)	Ozone Oxidation .....	.....	.....	.....	.....	415.3, Rev 1.2. ¹⁹	Hach Method 10261. ³⁷
	Calculation using DOC and UV ₂₅₄ data.	.....	.....	.....	.....	415.3, Rev 1.2. ¹⁹	
Dissolved Organic Carbon (DOC).	High Temperature Combustion	5310 B	5310 B	5310 B .....	.....	415.3, Rev 1.2. ¹⁹	
	Persulfate-Ultraviolet or Heated Persulfate Oxidation.	5310 C	5310 C	5310 C .....	.....	415.3, Rev 1.2. ¹⁹	
	Wet Oxidation	5310 D	5310 D .....	.....	.....	415.3, Rev 1.2. ¹⁹	
Ultraviolet absorption at 254 nm (UV ₂₅₄).	Spectrophotometry	5910 B	5910 B	5910 B	5910 B-11	415.3, Rev 1.2. ¹⁹	

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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.402(c)(2)

Organism	Methodology	SM 20th edition 5	SM 21st edition 1	SM 22nd edition 28	SM 23rd edition 49	SM online 3	Other
<i>E. coli</i>	Colilert .....	.....	9223 B	9223 B	9223 B	9223 B-97, B-04.	
	Colisure .....	.....	9223 B	9223 B	9223 B	9223 B-97, B-04.	
	Colilert-18	9223 B	9223 B	9223 B	9223 B	9223 B-97, B-04.	
	ReadiCult™ .....	.....	.....	.....	.....	.....	ReadiCult™. ²⁰
	Colitag	Modified Colitag™. ¹⁵
	Chromocult™	Chromocult™. ²¹
	EC-MUG	9221 F	9221 F	9221 F-06.	
	NA-MUG	9222 I.	



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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.402(c)(2)—Continued

Organism	Methodology	SM 20th edition ⁶	SM 21st edition ¹	SM 22nd edition ²⁸	SM 23rd edition ⁴⁹	SM online ³	Other
Enterococci	m-ColiBlue24 Test				9222 J.	9230 B-04.	
	Tecta EC/TC						
	Multiple-Tube Technique Membrane Filter Techniques.				9230 C.		
Coliphage	Fluorogenic Substrate Enterococcus Test (using Enterolert).				9230 D.		Fast Phase. ³⁰
	Two-Step Enrichment Presence-Absence Procedure.						



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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.852(a)(5)

Organism	Methodology category	Method	SM 20th, 21st editions ¹⁶	SM 22nd edition ²⁸	SM 23rd edition ⁴⁹	SM online ³
Total Coliforms	Lactose Fermentation Methods.	Standard Total Coliform Fermentation Technique, Presence-Absence (P-A) Coliform Test.		9221 B.1, B.2	9221 B.1, B.2, B.3, B.4.	9221 B.1, B.2-06.
	Membrane Filtration Methods.	Standard Total Coliform Membrane Filter Procedure using Endo Media.			9221 D.1, D.2, D.3.	9222 B. C.
	Enzyme Substrate Methods	Simultaneous Detection of Total Coliforms and <i>E. coli</i> by Dual Chromogen Membrane Filter Procedure (using mColiBlue24 medium).			9222 J.	
<i>Escherichia coli</i>	Escherichia coli Procedure (following Lactose Fermentation Methods).	Colilert+		9223 B	9223 B	9223 B-04.
		Colisure+		9223 B	9223 B	9223 B-04.
	Colilert-18	9223 B	9223 B	9223 B	9223 B-04.	
	Tecta EC/TC				9223 B-04.	
	EC-MUG medium		9221 F.1	9221 F.1	9221 F.1-06.	
	Escherichia coli Partitioning Methods (following Membrane Filtration Methods).	EC broth with MUG (EC-MUG).				9222 H.
		NA-MUG medium				9222 I.
Simultaneous Detection of Total Coliforms and <i>E. coli</i> by Dual Chromogen Membrane Filter Procedure.	mColiBlue24 medium			9222 J.		
Enzyme Substrate Methods	Colilert+		9223 B	9223 B	9223 B-04.	
	Colisure+		9223 B	9223 B	9223 B-04.	
	Colilert-18	9223 B	9223 B	9223 B	9223 B-04.	
	Tecta EC/TC				9223 B-04.	

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 143.4(b)

Contaminant	Methodology	EPA method	ASTM ⁴	SM 21st edition ¹	SM 22nd edition, ²⁸ SM 23rd edition ⁴⁹	SM online ³
Aluminum	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2. ²				
	Atomic Absorption; Direct			3111 D	3111 D.	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04, B-10.
Chloride	Inductively Coupled Plasma			3120 B	3120 B.	
	Silver Nitrate Titration		D 512-04 B, 12 B.	4500-Cl	4500-Cl	
Color	Ion Chromatography		D 4327-11	4110 B	4110 B.	
	Potentiometric Titration			4500-Cl ³ D	4500-Cl ³ D.	
Foaming Agents	Visual Comparison			2120 B	2120 B.	
Iron	Methylene Blue Active Substances (MBAS)			5540 C	5540 C.	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2. ²				
	Atomic Absorption; Direct			3111 B	3111 B.	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04, B-10.
	Inductively Coupled Plasma			3120 B	3120 B.	



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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 143.4(b)—Continued

Contaminant	Methodology	EPA method	ASTM ⁴	SM 21st edition ¹	SM 22nd edition, ²⁸ SM 23rd edition ⁴⁹	SM online ³
Manganese	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2. ²		3111 B	3111 B.	3113 B-04, B-10.
	Atomic Absorption; Direct					
Odor	Inductively Coupled Plasma			3120 B	3120 B.	
	Threshold Odor Test					
Silver	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2. ²		3111 B	3111 B.	3113 B-04, B-10.
	Atomic Absorption; Direct					
Sulfate	Inductively Coupled Plasma		D 4327-11	4500-SO ₄ 2 ³	4500-SO ₄ 2 ³	4500-SO ₄ 2 ³
	Ion Chromatography					
	Gravimetric with ignition of residue		D 516-07, 11, 16.	4500-SO ₄ 2 ³	4500-SO ₄ 2 ³	4500-SO ₄ 2 ³
	Gravimetric with drying of residue					
	Turbidimetric method		4500-SO ₄ 2 ³	4500-SO ₄ 2 ³	4500-SO ₄ 2 ³	4500-SO ₄ 2 ³
	Automated methylthymol blue method					
Total Dissolved Solids	Total Dissolved Solids Dried at 180 deg C			2540 C	2540 C.	
Zinc	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2. ²		3111 B	3111 B.	3113 B-04, B-10.
	Atomic Absorption; Direct Aspiration					
	Inductively Coupled Plasma			3120 B	3120 B.	



¹ Standard Methods for the Examination of Water and Wastewater, 21st edition (2005). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

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³ Standard Methods Online are available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

⁴ Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or <http://astm.org>. The methods listed are the only alternative versions that may be used.

⁵ Standard Methods for the Examination of Water and Wastewater, 20th edition (1998). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

⁶ Method ME355.01, Revision 1.0. "Determination of Cyanide in Drinking Water by GC/MS Headspace," May 26, 2009. Available at <https://www.nemi.gov> or from James Eaton, H & E Testing Laboratory, 221 State Street, Augusta, ME 04333, (207) 287-2727.

⁷ Systeas Easy (1-Reagent), "Systeas Easy (1-Reagent) Nitrate Method," February 4, 2009. Available at <https://www.nemi.gov> or from Systeas Scientific, LLC., 900 Jorie Blvd., Suite 35, Oak Brook, IL 60523.

⁸ EPA Method 524.3, Version 1.0. "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry," June 2009. EPA 815-B-09-009. Available at <https://www.nemi.gov>.

⁹ Mitchell Method M5271, Revision 1.1. "Determination of Turbidity by Laser Nephelometry," March 5, 2009. Available at <https://www.nemi.gov> or from Leck Mitchell, Ph.D., PE, 656 Independence Valley Dr., Grand Junction, CO 81507.

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¹¹ Orion Method AQ4500, Revision 1.0. "Determination of Turbidity by LED Nephelometry," May 8, 2009. Available at <https://www.nemi.gov> or from Thermo Scientific, 166 Cummings Center, Beverly, MA 01915. <http://www.thermo.com>.

¹² Modified Colitag™ Method. "Modified Colitag™ Test Method for the Simultaneous Detection of E. coli and other Total Coliforms in Water (ATP D05-0035)," August 28, 2009. Available at <https://www.nemi.gov> or from CPI International, 5580 Skylane Boulevard, Santa Rosa, CA 95403.

¹³ EPA Method 557. "Determination of Haloacetic Acids, Bromate, and Dalapon in Drinking Water by Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)," September 2009. EPA 815-B-09-012. Available at <https://www.nemi.gov>.

¹⁴ AMI Turbiwell. "Continuous Measurement of Turbidity Using a SWAN AMI Turbiwell Turbidimeter," August 2009. Available at <https://www.nemi.gov> or from Markus Bernasconi, SWAN Analytische Instrumente AG, Studbachstrasse 13, CH-8340 Hinwil, Switzerland.

¹⁵ EPA Method 334.0. "Determination of Residual Chlorine in Drinking Water Using an On-line Chlorine Analyzer," September 2009. EPA 815-B-09-013. Available at <https://www.nemi.gov>.

¹⁶ ChloroSense. "Measurement of Free and Total Chlorine in Drinking Water by Palintest ChloroSense," August 2009. Available at <https://www.nemi.gov> or from Palintest Ltd., 1455 Jamike Avenue (Suite 100), Erlanger, KY 41018.

¹⁷ EPA Method 302.0. "Determination of Bromate in Drinking Water using Two-Dimensional Ion Chromatography with Suppressed Conductivity Detection," September 2009. EPA 815-B-09-014. Available at <https://www.nemi.gov>.

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²¹ Hach Company. "Hach Company SPADNS 2 (Arsenite-Free) Fluoride Method 10225—Spectrophotometric Measurement of Fluoride in Water and Wastewater," January 2011. 5600 Lindbergh Drive, P.O. Box 389, Loveland, Colorado 80539.

²² Hach Company. "Hach Company TNTplus™ 835/836 Nitrate Method 10206—Spectrophotometric Measurement of Nitrate in Water and Wastewater," January 2011. 5600 Lindbergh Drive, P.O. Box 389, Loveland, Colorado 80539.

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- ³³ Tecta EC/TC. "Tecta™ EC/TC Medium and Tecta™ Instrument: A Presence/Absence Method for the Simultaneous Detection of Total Coliforms and *Escherichia coli* (*E. coli*) in Drinking Water." version 1.0. May 2014. Available from Pathogen Detection Systems, Inc., 382 King Street East, Kingston, Ontario, Canada, K7K 2Y2.
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- ⁴⁴ Lovibond PTV 1000. "Continuous Measurement of Drinking Water Turbidity Using a Lovibond PTV 1000 White Light LED Turbidimeter." December 2016. Revision 1.0. Available from Tintometer, Inc., 6456 Parkland Drive, Sarasota, FL 34243.
- ⁴⁵ Lovibond PTV 2000. "Continuous Measurement of Drinking Water Turbidity Using a Lovibond PTV 2000 660-nm LED Turbidimeter." December 2016. Revision 1.0. Available from Tintometer, Inc., 6456 Parkland Drive, Sarasota, FL 34243.
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- ⁴⁷ Thermo Fisher. "Thermo Fisher Method 557.1: Determination of Haloacetic Acids in Drinking Water using Two-Dimensional Ion Chromatography with Suppressed Conductivity Detection." January 2017. Version 1.0. Available from Thermo Fisher Scientific, 490 Lakeside Dr., Sunnyvale, CA 94085 (Richard.jack@thermofisher.com).
- ⁴⁸ EPA Method 150.3. "Determination of pH in Drinking Water." February 2017. EPA 815-B-17-001. Available at the National Service Center for Environmental Publications (EPA Method 150.3).
- ⁴⁹ Standard Methods for the Examination of Water and Wastewater, 23rd edition (2017). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.
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- ⁵¹ Hach Company. "Hach Method 10258—Determination of Turbidity by 360° Nephelometry." March 2018. Revision 2.0. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.
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[FR Doc. 2018-22162 Filed 10-11-18; 8:45 am]

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