

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 online ³	ASTM ⁴	Other
Nitrite	Reduction/Colorimetric .....	.....	.....	.....	.....	.....	Systea Easy (1-Reagent) ⁸ Hach TNTplus™ 835/836 Method 10206 ²³
	Colorimetric; Direct .....	.....	.....	.....	.....	.....
	Ion Chromatography Automated Cadmium Reduction. ....	.....	4110 B	4110 B	.....	D 4327-11.	
	Manual Cadmium Reduction. ....	.....	4500-NO ₃ -F.	4500-NO ₃ -F.	.....	.....
	Spectrophotometric .....	.....	4500-NO ₃ -E.	4500-NO ₃ -E.	.....	.....
Orthophosphate.	Reduction/Colorimetric .....	.....	4500-NO ₂ -B.	4500-NO ₂ -B.	.....	.....	Systea Easy (1-Reagent) ⁸
	Ion Chromatography .....	.....	4110 B	4110 B	.....	D 4327-11.	
pH	Colorimetric, ascorbic acid, single reagent. ....	.....	4500-P E	4500-P E	4500-P E-99.	.....	.....
	Colorimetric, Automated, Ascorbic Acid. ....	.....	4500-P F	4500-P F	4500-P F-99.	.....	.....
Selenium	Electrometric .....	.....	4500-H ⁺ B	4500-H ⁺ B	.....	D 1293-12	.....
	Hydride-Atomic Absorption. ....	.....	3114 B	3114 B	3114 B-09	D 3859-08 A.	.....
Silica	Atomic Absorption; Furnace. ....	.....	3113 B	3113 B	3113 B-04, B-10.	D 3859-08 B.	.....
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES).	200.5, Revision 4.2 ².	.....	.....	.....	.....	.....
	Colorimetric .....	.....	.....	.....	.....	D859-05, 10	.....
	Molybdosilicate .....	.....	4500-SiO ₂ C.	4500-SiO ₂ C.	.....	.....	.....
Sodium	Heteropoly blue .....	.....	4500-SiO ₂ D.	4500-SiO ₂ D.	.....	.....	.....
	Automated for Molybdate-reactive Silica. ....	.....	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	.....	.....	.....
	Atomic Absorption; Direct Aspiration. ....	.....	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	.....
Temperature.	Thermometric .....	.....	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 online ³
Benzene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Carbon tetrachloride	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Chlorobenzene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
1,2-Dichlorobenzene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
1,4-Dichlorobenzene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
1,2-Dichloroethane	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
cis-Dichloroethane	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
trans-Dichloroethane	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Dichloromethane	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
1,2-Dichloropropane	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Ethylbenzene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Styrene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Tetrachloroethylene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
1,1,1-Trichloroethane	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Trichloroethylene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Toluene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
1,2,4-Trichlorobenzene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
1,1-Dichloroethylene	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
1,1,2-Trichloroethane	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Vinyl chloride	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Xylenes (total)	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
2,4-D	Gas Chromatography/Electron Capture Detection (GC/ECD)	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
2,4,5-TP (Silvex)	Gas Chromatography/Electron Capture Detection (GC/ECD)	524.3.9, 524.4.29	6640 B	6640 B	6640 B-01, B-06.
Alachlor	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3.24	6610 B	6610 B	6610 B-04.
Atrazine	Liquid Chromatography Electro spray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS).	536.25	6610 B	6610 B	6610 B-04.
Benzo(a)pyrene	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3.24, 523.26	6610 B	6610 B	6610 B-04.
Carbofuran	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3.24	6610 B	6610 B	6610 B-04.
Chlordane	High-performance liquid chromatography (HPLC) with post-column derivatization and fluorescence detection.	525.3.24	6610 B	6610 B	6610 B-04.
Dalapon	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	557.14	6640 B	6640 B	6640 B-01, B-06.
Di(2-ethylhexyl)adipate	Ion Chromatography Electro spray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS).	525.3.24	6640 B	6640 B	6640 B-01, B-06.
Di(2-ethylhexyl)phthalate	Gas Chromatography/Electron Capture Detection (GC/ECD)	525.3.24	6640 B	6640 B	6640 B-01, B-06.

Dibromochloropropane (DBCP)	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3 ⁹	6640 B	6640 B	6640 B-01, B-06.
Dinoseb	Gas Chromatography/Electron Capture Detection (GC/ECD)				
Endrin	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3 ²⁴			
Ethyl dibromide (EDB)	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3 ⁹	6651 B	6651 B	6651 B-00, B-05.
Glyphosate	High-Performance Liquid Chromatography (HPLC) with Post-Column Derivatization and Fluorescence Detection.				
Heptachlor	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
Heptachlor Epoxide	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
Hexachlorobenzene	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
Hexachlorocyclopentadiene	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
Lindane	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
Methoxychlor	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
Oxamyl	High-performance liquid chromatography (HPLC) with post-column derivatization and fluorescence detection.		6610 B	6610 B	6610 B-04.
PCBs (as Aroclors)	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
Pentachlorophenol	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06.
Picloram	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
Simazine	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06.
Toxaphene	Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS).	536 ²⁵			
Total Trihalomethanes	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS).	525.3 ²⁴			
	Purge & trap/Gas Chromatography/Mass Spectrometry	524.3 ⁹	524.4 ²⁹		

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40 CFR Ch. I (7-1-14 Edition)

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

Contaminant	Methodology	SM 21st Edition ¹	SM 22nd Edition ^{2e}	ASTM ⁴
Naturally Occurring:				
Gross alpha and beta	Evaporation	7110 B	7110 B.	
Gross alpha	Coprecipitation	7110 C	7110 C.	
Radium 226	Radon emanation	7500-Ra C	7500-Ra C	D3454-05
	Radiochemical	7500-Ra B	7500-Ra B	D2460-07
Radium 228	Radiochemical	7500-Ra D	7500-Ra D.	
Uranium	Radiochemical	7500-U B	7500-U B.	
	ICP-MS	3125		D5673-05, 10
	Alpha spectrometry	7500-U C	7500-U C	D3972-09
	Laser Phosphorimetry			D5174-07
	Alpha Liquid Scintillation Spectrometry			D6239-09
Man-Made:				
Radioactive Cesium	Radiochemical	7500-Cs B	7500-Cs B.	
	Gamma Ray Spectrometry	7120	7120	D3649-06
Radioactive Iodine	Radiochemical	7500-I B	7500-I B	D3649-06
		7500-I C	7500-I C.	
		7500-I D	7500-I D.	
	Gamma Ray Spectrometry	7120	7120	D4785-08
Radioactive Strontium 89, 90	Radiochemical	7500-Sr B	7500-Sr B.	
Tritium	Liquid Scintillation	7500- ³ H B	7500- ³ H B	D4107-08
Gamma Emitters	Gamma Ray Spectrometry	7120	7120	D3649-06
		7500-Cs B	7500-Cs B	D4785-08
		7500-I B	7500-I B	

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

Organism	Methodology	SM 21st Edition ¹	SM 22nd Edition ^{2,3}	SM Online ³	Other
Total Coliform	Total Coliform Fermentation Technique.	9221 A, B, C	9221 A, B, C	9221 A,B,C-06.	
	Total Coliform Membrane Filter Technique.	9222 A, B, C			
	ONPG-MUG Test	9223	9223 B	9223 B-04.	
Fecal Coliforms	Fecal Coliform Procedure	9221 E	9221 E	9221 E-06.	
	Fecal Coliform Filter Procedure.	9222 D	9222 D	9222 D-06.	
	Pour Plate Method	9215 B	9215 B	9215 B-04.	
Heterotrophic bacteria	Nephelometric Method	2130 B	2130 B.		Mitchell M5271, ¹⁰
	Laser Nephelometry (on-line)				Mitchell M5331, ¹¹
Turbidity	LED Nephelometry (on-line)				AMI Turbiwell-1s
	LED Nephelometry (on-line)				Orion AQ4500, ¹²
	LED Nephelometry (portable)				

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

Residual	Methodology	SM 21st Edition ¹	SM 22nd Edition ²⁸	ASTM ⁴	Other
Free Chlorine.	Amperometric Titration	4500-CI D	4500-CI D	D 1253-08.	
	DPD Ferrous Titrimetric	4500-CI F	4500-CI F.		Hach Method 10260. ³¹
	DPD Colorimetric	4500-CI G	4500-CI G		
	Syringaldazine (FACTS)	4500-CI H	4500-CI H.		EPA 334.0. ¹⁶
Total Chlorine.	On-line Chlorine Analyzer				ChloroSense. ¹⁷
	Amperometric Sensor				
	Amperometric Titration	4500-CI D	4500-CI D	D 1253-08.	
	Amperometric Titration (Low level measurement).	4500-CI E	4500-CI E.		
Chlorine Dioxide.	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.		EPA 334.0. ¹⁶
	On-line Chlorine Analyzer				ChloroSense. ¹⁷
Chlorine Dioxide.	Amperometric Sensor				
	Amperometric Titration	4500-CIO ₂ C	4500-CIO ₂ C.		
Chlorine Dioxide.	Amperometric Titration	4500-CIO ₂ E	4500-CIO ₂ E.		
	Amperometric Sensor				ChlordioX Plus. ³²
Ozone	Indigo Method	4500-O ₃ B	4500-O ₃ B.		

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	Other
TTHM HAA5	P&T/GC/MS LLE (diazomethane)/ GC/ECD. Ion Chromatography Electrospray Ioniza- tion Tandem Mass Spectrometry (IC- ESI-MS/MS).	524.3 ⁹ , 524.4, ²⁹ 557 ¹⁴		6251 B-07	6251 B	6251 B.	
Bromate	Two-Dimensional Ion Chromatography (IC). Ion Chromatography Electrospray Ioniza- tion Tandem Mass Spectrometry (IC- ESI-MS/MS). Chemically Sup- pressed Ion Chro- matography. Electrolytically Sup- pressed Ion Chro- matography.	302.0 ¹⁸ 557 ¹⁴	D 6581-08 A D 6581-08 B D 6581-08 A D 6581-08 B				
Chlorite	Chemically Sup- pressed Ion Chro- matography. Electrolytically Sup- pressed Ion Chro- matography. Electrolytically Sup- pressed Ion Chro- matography. Amperometric Titra- tion.						
Chlorite—daily moni- toring as prescribed in 40 CFR 141.132(b)(2)(i)(A).	Amperometric Sensor				4500-ClO, E	4500-ClO, E.	Chloridiox 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	ASTM ⁴	Other
Free Chlorine	Amperometric Titration DPD Ferrous Titrimetric DPD Colorimetric Syringadiazine (FACTS) Amperometric Sensor On-line Chlorine Analyzer	4500-Cl D 4500-Cl F 4500-Cl G 4500-Cl H	4500-Cl D 4500-Cl F 4500-Cl G 4500-Cl H	D 1253-08.	Hach Method 10260 ³¹ , ChloroSense ¹⁷ , EPA 334.0 ¹⁶ .

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

Residual	Methodology	SM 21st Edition ¹	SM 22nd Edition ^{2a}	ASTM ⁴	Other
Combined Chlorine	Amperometric Titration	4500-CI D	4500-CI D	D 1253-08.	Hach Method 10260 ³¹ .
	DPD Ferrous Titrimetric	4500-CI F	4500-CI F	.....
	DPD Colorimetric	4500-CI G	4500-CI G	.....
	Amperometric Titration	4500-CI D	4500-CI D	D 1253-08.	
Total Chlorine	Amperometric Titration	4500-CI D	4500-CI D	Hach Method 10260 ³¹ .
	Low level Amperometric Titration.	4500-CI E	4500-CI E	.....
	DPD Ferrous Titrimetric	4500-CI F	4500-CI F	.....
	DPD Colorimetric	4500-CI G	4500-CI G	.....
Chlorine Dioxide	Iodometric Electrode	4500-CI I	4500-CI I	Hach Method 10260 ³¹ . ChloroSense 17. EPA 334.0 ¹⁶ . Chloridiox Plus ³² .
	Amperometric Sensor	.....	.....	.....
	On-line Chlorine Analyzer	.....	.....	.....
	Amperometric Method II	4500-CIO ₂ E	4500-CIO ₂ E	
	
	

Environmental Protection Agency

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ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.131(c)(2), IF APPROVED BY THE STATE

Residual	Methodology	Method
Free Chlorine	Test Strips	Method D99-003 ⁵

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

Parameter	Methodology	SM 21st Edition ¹	SM 22nd Edition ^{2,8}	SM Online ³	EPA
Total Organic Carbon (TOC)	High Temperature Combustion.	5310 B	5310 B	.....	415.3, Rev 1.2 ¹⁹ .
	Persulfate-Ultraviolet or Heated Persulfate Oxidation.	5310 C	5310 C	.....	415.3, Rev 1.2 ¹⁹ .
	Wet Oxidation	5310 D	5310 D	.....	415.3, Rev 1.2 ¹⁹ .
Specific Ultraviolet Absorbance (SUVA). Dissolved Organic Carbon (DOC).	Calculation using DOC and UV ₂₅₄ data.	.....	.....	.....	415.3, Rev 1.2 ¹⁹ .
	High Temperature Combustion.	5310 B	5310 B	.....	415.3, Rev 1.2 ¹⁹ .
Ultraviolet absorption at 254 nm (UV ₂₅₄).	Persulfate-Ultraviolet or Heated Persulfate Oxidation.	5310 C	5310 C	.....	415.3, Rev 1.2 ¹⁹ .
	Wet Oxidation	5310 D	5310 D	.....	415.3, Rev 1.2 ¹⁹ .
	Spectrophotometry	5910 B	5910 B	5910 B-11	415.3, Rev 1.2 ¹⁹ .