**Section 611.531 Analytical Requirements**

A supplier must use the analytical methods in this Section or Agency-approved alternative methods under Section 611.480 to demonstrate compliance with only 611.Subpart B. A supplier must measure pH, temperature, turbidity, and RDCs under the supervision of a certified operator. A supplier must conduct measurements for total coliforms, fecal coliforms and HPC using a certified laboratory in one of the categories in Section 611.490(a). The supplier must perform analyses using the methods in this Section, each incorporated by reference in Section 611.102:

a) Basic Water Parameters and Microbiological Quality

1) The supplier must analyze for pH and temperature using one of the methods in Section 611.611; and

2) The supplier must analyze for total coliforms, fecal coliforms, heterotrophic bacteria, and turbidity using specific methods and analytical test procedures in USEPA Technical Notes, incorporated by reference in Section 611.102:

A) Total Coliforms

BOARD NOTE: The time from sample collection to beginning analysis for source (raw) water samples must not exceed eight hours. The supplier should but needs not hold samples below 10° C during transit.

i) Total Coliform Fermentation Technique. SM 9221 A (93), SM 9221 A (94), SM 9221 A (99), SM 9221 A (06), SM 9221 A (14), SM 9221 B (93), SM 9221 B (94), SM 9221 B (99), SM 9221 B (06), SM 9221 B (14), SM 9221 C (93), SM 9221 C (94), SM 9221 C (99), SM 9221 C (06), or SM 9221 C (14).

BOARD NOTE: The supplier may use commercially available lactose broth in lieu of lauryl tryptose broth if the supplier conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water it normally tests, and this comparison demonstrates that the false-positive rate and false-negative rate for total coliforms is less than ten percent using lactose broth. If the supplier uses inverted tubes to detect gas production, the media should cover these tubes at least one-half to two-thirds after the supplier adds the sample. The supplier needs not run the completed phase on ten percent of all total coliform-positive confirmed tubes.

ii) Total Coliform Membrane Filter Technique. SM 9222 A (91), SM 9222 A (94), SM 9222 A (97), SM 9222 A (06), SM 9222 A (15), SM 9222 B (91), SM 9222 B (94), SM 9222 B (97), 9222 B (06), SM 9222 B (15), SM 9222 C (91), SM 9222 C (94), SM 9222 C (97), SM 9222 C (06), or SM 9222 C (15).

iii) ONPG-MUG (also known as Colilert®). SM 9223 (92), SM 9223 (94), SM 9223 (97), SM 9223 B (04), or SM 9223 B (16).

B) Fecal Coliforms

BOARD NOTE: The time from collecting the sample to beginning analysis of source (raw) water samples must not exceed eight hours. The supplier should but needs not hold samples below 10° C during transit.

i) Fecal Coliform Procedure. SM 9221 E (93), SM 9221 E (94), SM 9221 E (99), SM 9221 E (06), or SM 9221 E (14).

BOARD NOTE: A-1 broth may be held up to seven days in a tightly closed screwcap tube at 4° C (39° F).

BOARD NOTE: The supplier may hold A-1 broth up to seven days in a tightly closed screwcap tube at 4 °C (39 °F).

ii) Fecal Coliform Membrane Filter Procedure. SM 9222 D (91), SM 9222 D (94), SM 9222 D (97), SM 9222 D (06), or SM 9222 D (15).

C) Heterotrophic Bacteria

i) Pour Plate Method. SM 9215 B (88), SM 9215 B (94), SM 9215 B (00), SM 9215 B (04), or SM 9215 B (16).

BOARD NOTE: The time from collecting the sample to beginning analysis must not exceed eight hours. The supplier should but needs not hold samples below 10 ºC during transit.

ii) SimPlate (00).

D) Turbidity

BOARD NOTE: Styrene divinyl benzene beads (e.g.,AMCO-AEPA-1 or equivalent) and stabilized formazin (e.g.,Hach StablCal™ or equivalent) are acceptable substitutes for formazin.

i) Nephelometric Method. SM 2130 B (88), SM 2130 B (94), SM 2130 B (01); USEPA 180.1 (93); or Hach 8195 (18).

ii) GLI Method 2 (92).

iii) Laser Nephelometry. Hach 10133 (00) (FilterTrak).

iv) Laser Nephelometry (On-Line). Lovibond PTV 6000 (16), Mitchell M5271 (09), or Mitchell M5331 (16).

v) Laser Nephelometry (Portable). Lovibond TB 6000 (21).

vi) LED Nephelometry (On-Line). AMI Turbiwell (09), Lovibond PTV 1000 (16), Lovibond PTV 2000 (16), Mitchell M5331 (09), or Mitchell M5331 (16).

vii) LED Nephelometry (Portable). Orion AQ4500 (09), Lovibond TB 3500 (21), Lovibond TB 5000 (21).

viii) 360° Nephelometry. Hach 10258 (16) or Hach 10258 (18).

b) A supplier must measure residual disinfectant concentrations with specific analytical methods:

1) Free Chlorine

A) Amperometric Titration. ASTM D1253-03, ASTM D1253-08, ASTM D1253-14, SM 4500-Cl D (89), SM 4500-Cl D (93), or SM 4500-Cl D (00).

B) DPD Ferrous Titrimetric. SM 4500-Cl F (89), SM 4500-Cl F (93), or SM 4500-Cl F (00).

C) DPD Colimetric. Hach 10260 (13), SM 4500-Cl G (89), SM 4500-Cl G (93), or SM 4500-Cl G (00).

D) Syringaldazine (FACTS). SM 4500-Cl H (89), SM 4500-Cl H (93), or SM 4500-Cl H (00).

E) On-Line Chlorine Analyzer. USEPA 334.0 (09).

F) Amperometric Sensor. Palintest ChloroSense (09) and Palintest ChloroSense (20).

G) Indophenol Colorimetric. Hach 10241 (15).

2) Total Chlorine

A) Amperometric Titration. ASTM D1253-03, ASTM D1253-08, ASTM D1253-14, SM 4500-Cl D (89), SM 4500-Cl D (93), or SM 4500-Cl D (00).

B) Amperometric Titration (low level measurement). SM 4500-Cl E (89), SM 4500-Cl E (93), or SM 4500-Cl E (00).

C) DPD Ferrous Titrimetric. SM 4500-Cl F (89), SM 4500-Cl F (93), or SM 4500-Cl F (00).

D) DPD Colimetric. SM 4500-Cl G (89), SM 4500-Cl G (93), SM 4500-Cl G (00), or Hach 10260 (13).

E) Iodometric Electrode. SM 4500-Cl I (89), SM 4500-Cl I (93), or SM 4500-Cl I (00).

F) On-Line Chlorine Analyzer. USEPA 334.0 (09).

G) Amperometric Sensor. Palintest ChloroSense (09) and Palintest ChloroSense (20).

H) Indophenol Colorimetric. USEPA 127 (21).

3) Chlorine Dioxide

A) Amperometric Titration. Palintest ChlordioX Plus (13), Palintest ChlordioX Plus (20), SM 4500-ClO2 C (88), SM 4500-ClO2 C (93), SM 4500-ClO2 C (00), SM 4500-ClO2 E (88), SM 4500-ClO2 E (93), or SM 4500-ClO2 E (00).

B) DPD Method. SM 4500-ClO2 D (88) or SM 4500-ClO2 D (93).

C) Spectrophotometric. USEPA 327.0 (05).

4) Ozone. Indigo Method. SM 4500-O3 B (88), SM 4500-O3 B (93), or SM 4500-O3 B (00).

5) Alternative Test Methods. The Agency may issue a SEP allowing a supplier to use alternative chlorine test methods:

A) DPD Colorimetric Test Kits. A supplier may measure residual disinfectant concentrations for free chlorine and combined chlorine using ITS Method D99-003.

B) Continuous Monitoring for Free and Total Chlorine. A supplier may measure free and total chlorine residuals continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument, provided the chemistry, accuracy, and precision remain the same. A supplier must calibrate instruments it uses for continuous monitoring with a grab sample measurement at least every five days or as the Agency provides otherwise in a SEP.

BOARD NOTE: This Section derives from 40 CFR 141.74(a) and appendix A to subpart C of 40 CFR 141. The Board did not separately list approved alternative methods from Standard Methods Online that are the same version as a method appearing in a printed edition of Standard Methods. Using the Standard Methods Online copy is acceptable.

Standard Methods Online, Method 2130 B-01 appears in the 21st, 22nd, and 23rd editions as Method 2130 B. This appears in this Section as SM 2130 B (01).

Standard Methods Online, Methods 4500‑Cl D-93, 4500‑Cl E-93, 4500‑Cl F-93, 4500‑Cl G-93, 4500‑Cl H-93, and 4500‑Cl I-93 appear in the 19th and 20th editions as Methods 4500‑Cl D, 4500‑Cl E, 4500‑Cl F, 4500‑Cl G, 4500‑Cl H, and 4500‑Cl I. These appear in this Section as SM 4500‑Cl D (93), SM 4500‑Cl E (93), SM 4500‑Cl F (93), SM 4500‑Cl G (93), SM 4500‑Cl H (93), and SM 4500‑Cl I (93).

Standard Methods Online, Methods 4500‑Cl D-00, 4500‑Cl E-00, 4500‑Cl F-00, 4500‑Cl G-00, 4500‑Cl H-00, and 4500‑Cl I-00 appear in the 21st, 22nd, and 23rd editions as Methods 4500‑Cl D, 4500‑Cl E, 4500‑Cl F, 4500‑Cl G, 4500‑Cl H, and 4500‑Cl I. These appear in this Section as SM 4500‑Cl D (00), SM 4500‑Cl E (00), SM 4500‑Cl F (00), SM 4500‑Cl G (00), SM 4500‑Cl H (00), and SM 4500‑Cl I (00).

Standard Methods Online, Methods 4500‑ClO2 C-93, 4500‑ClO2 D-93, and 4500‑ClO2 E-93 appear in the 19th and 20th editions as Methods 4500‑ClO2 C, 4500‑ClO2 D, and 4500‑ClO2 E. These appear in this Section as SM 4500‑ClO2 C (93), SM 4500‑ClO2 D (93), and SM 4500‑ClO2 E (93).

Standard Methods Online, Methods 4500‑ClO2 C-00 and 4500‑ClO2 E-00 appear in the 19th and 20th editions as Methods 4500‑ClO2 C and 4500‑ClO2 E. These appear in this Section as SM 4500‑ClO2 C (00) and SM 4500‑ClO2 E (00).

Standard Methods Online, Method 4500‑O3 B-97 appears in the 20th edition as Method 4500‑O3 B. This appears in this Section as SM 4500‑O3 B (97).

Standard Methods Online, Method 9215 B-00 appears in the 21st edition as Method 9215 B. This appears in this Section as SM 9215 B (00).

Standard Methods Online, Method 9215 B-04 appears in the 22nd edition as Method 9215 B. This appears in this Section as SM 9215 B (04).

Standard Methods Online, Methods 9221 A-99, 9221 B-99, and 9221 C-99 appear in the 21st edition as Methods 9221 A, 9221 B, and 9221 C. These appear in this Section as SM 9221 A (99), SM 9221 B (99), and SM 9221 C (99).

Standard Methods Online, Methods 9221 A-06, 9221 B-06, 9221 C-06, and 9221 E-06 appear in the 22nd edition as Methods 9221 A, 9221 B, 9221 C, and 9221 E. These appear in this Section as SM 9221 A (06), SM 9221 B (06), SM 9221 C (06), and SM 9221 E (06).

Standard Methods Online, Methods 9222 A-97, 9222 B-97, and 9222 C-97 appear in the 20th and 21st editions as Methods 9222 A, 9222 B, and 9222 C. These appear in this Section as SM 9222 A (97), SM 9222 B (97), and SM 9222 C (97).

Standard Methods Online, Method 9223 B-97 appears in the 20th and 21st editions as Method 9223 B. This appears in this Section as SM 9223 B (97).

Standard Methods Online, Method 9223 B-04 appears in the 22nd edition as Method 9223 B. This appears in this Section as SM 9223 B (04).

(Source: Amended at 47 Ill. Reg. 18996, effective December 7, 2023)