

**Biochemical Oxygen Demand (BOD) and Carbonaceous Biochemical Oxygen Demand (CBOD)****SM 5210B- 2001 (2011)**

*ADDITIONAL QC REQUIREMENTS FOR THIS METHOD: Certified or Accredited laboratories using this method are assessed to applicable requirements of SM 1020 and SM 5020.*

Facility Name: \_\_\_\_\_ VELAP ID: \_\_\_\_\_

Assessor Name: \_\_\_\_\_ Analyst Name: \_\_\_\_\_ Inspection Date: \_\_\_\_\_

Relevant Aspect of Standards	Method Reference	Y	N	N/A	Comments
<i>Records Examined:</i> SOP Number/ Revision/ Date _____ Analyst: _____					
Sample ID: _____ Date of Sample Preparation: _____ Date of Analysis: _____					
1) Are samples preserved at $\leq 6^{\circ}\text{C}$ until time of analysis, if analysis is not begun within 2 hours of collection?	5210B.4.a, 40CFR136.3 Table 11				
2) Are samples analyzed within 48 hours of collection?	40CFR136.3 Table 11				
3) Is distilled water or equivalent used for preparing buffer solutions, GGA, sodium sulfite solution, $\text{H}_2\text{SO}_4$ , and NaOH? ( <i>Note per Table 1080:1, deionized water is not sufficient for removal of particulates, bacteria, and pyrogens/endotoxins.</i> )	5210B.3				
4) Is the dilution water source demineralized, distilled, tap, or natural water? ( <i>Deionized water is discouraged.</i> )	5210B.3.j, 5210B.4.c				
5) Is the dilution water source free of copper and chlorine?	5210B.4.c				
6) Is the dilution water dissolved oxygen at least 7.5 mg/L?	5210B.5.a				
7) Are appropriate concentrations of phosphate buffer, $\text{MgSO}_4$ , $\text{CaCl}_2$ , and $\text{FeCl}_3$ added to dilution water? (Buffer may be purchased in pre-made buffer pillows, or individual reagents made in the laboratory may be added to dilution water as specified in the method.)	5210B.3 and 5210B.5.a				
8) Are samples checked for residual chlorine, and if chlorine is present, are they dechlorinated using the appropriate amount of sodium sulfite (determined by titration as specified in method)?	5210B.4.b.2				
9) Is pH of all samples verified to be between 6.0 and 8.0, and if not, are samples warmed to $20 \pm 3^{\circ}\text{C}$ and then pH adjusted to between 7.0 and 7.2 with $\text{H}_2\text{SO}_4$ and/or NaOH?	5210B.4.b.1				

Notes/ Comments:

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10) Are all samples brought to 20 ± 3°C before making dilutions?	5210B.5.b				
11) Are samples supersaturated with dissolved oxygen aerated or vigorously shaken? <i>Note the following saturation values per Table 4500-O:l:</i> 17.0 °C - 9.665 mg/L 18.0 °C - 9.467 mg/L 19.0 °C - 9.276 mg/L 20.0 °C - 9.092 mg/L 21.0 °C - 8.915 mg/L 22.0 °C - 8.743 mg/L 23.0 °C - 8.578 mg/L	5210B.4.b.4				
12) Are at least three dilutions analyzed for each sample, to produce a residual DO of at least 1.0 mg/L and a DO uptake of at least 2.0 mg/L after 5-day incubation?	5210B.5.c				
13) Are samples mixed immediately before pipetting or pouring to avoid loss of solids by settling?	5210B.5.c.1				
14) For dilutions prepared directly in BOD bottles, when a bottle contains more than 67% (>200 mL of sample in 300 mL bottle) of sample, are buffer solutions added directly to the diluted sample at a rate of 1mL/L (0.3mL/300mL bottle)? ( <i>Note that commercially prepared buffer solution pillows are available to correctly dose 300 mL bottles.</i> )	5210B.5.c.2				
15) For dilutions prepared in volumetric containers, when dilutions are greater than 1:100, is a primary dilution made before making the final dilution in the bottle?	5210B.5.c.1				
16) Are one or more dilution water blanks analyzed with each batch of samples, with a maximum acceptable value of 0.20 mg/L? (If blanks exceed 0.20 mg/L, the associated data are flagged or discarded.)	5210B.6.c				
17) Are BOD seed controls analyzed [using, ideally, three dilutions of seed] with the smallest quantity of seed producing at least 2.0 mg/L DO depletion and the largest quantity producing at least 1.0 mg/L residual DO after 5 days of incubation?	5210B.6.d, 5210B.7.b				
18) Are three GGA checks analyzed with each batch of samples, with an acceptable average range of 198 ± 30.5 mg/L for BOD and for CBOD?	5210B.6.b				
Notes/ Comments:					

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19) Is at least one duplicate analyzed for each matrix type daily or with each batch of 20 or fewer samples?	5020B.2.f				
20) Is seed added to all samples before final dilution, with stirring of the seed suspension performed during transfer?	5210B.5.d				
21) Is the same amount of seed added to GGA bottles and to environmental sample bottles?	5210B.5.d				
22) Is nitrification inhibitor added at a rate of 3 mg to 300 mL for CBOD? <i>NOTE: If commercial TCMP formulation is not 100% TCMP, adjust dosage appropriately.</i>	5210B.5.e				
23) Is nitrification inhibitor added only <i>after</i> CBOD bottles are at least two-thirds filled with diluted sample?	5210B.5.e				
24) Are bottles sealed in a manner ensuring that no bubbles are trapped inside, and are the mouths of the bottles covered to prevent evaporation?	5210B.5.f				
25) Is initial dissolved oxygen measured within 30 minutes of sample dilution?	5210B.5.g				
26) Are bottles incubated in the dark at $20 \pm 1^\circ\text{C}$ ?	5210B.2.b, 5210B.5.h				
27) Are results calculated using only qualifying data which have a minimum DO depletion of 2.0 mg/L and a residual DO of a least 1.0 mg/L after 5 days of incubation?	5210B.6.a				
28) Are results calculated and reported according to the method, and all qualified bottles averaged for each dilution series?	5210B.7				

Notes/ Comments: