



[Visit Suncam.com for more courses](http://www.suncam.com)

Continuing Education Course #273
MBBR Wastewater Treatment Processes

1. The moving bed biofilm reactor (MBBR) wastewater treatment process is which of the following?
 - a. a suspended growth process
 - b. a trickling filter process
 - c. an activated sludge process
 - d. an attached growth process

2. The volume requirement for a MBBR wastewater treatment process will be which of the following in comparison with an activated sludge process designed to treat the same wastewater flow?
 - a. slightly larger
 - b. smaller
 - c. about the same
 - d. much larger

3. Which of the following statements is correct regarding the sludge recycle in a MBBR wastewater treatment process?
 - a. The sludge recycle rate is greater than that for an activated sludge process.
 - b. There is no sludge recycle in this type of process.
 - c. The sludge recycle rate depends upon the SRT of the process.
 - d. Sludge recycle is only needed if nitrification takes place in the process.

4. Which of the following best describes the type of tank typically used for a MBBR process?
 - a. a tank similar to an activated sludge secondary clarifier
 - b. a tank similar to one used for a trickling filter
 - c. a tank similar to an activated sludge aeration tank
 - d. a tank similar to a primary clarifier

5. What is the BOD loading rate in g/day to a MBBR process for a wastewater influent flow rate to the MBBR tank of 0.1 MGD having a BOD concentration 200 mg/L?
 - a. 75,660
 - b. 53,500
 - c. 9,070
 - d. 167

6. Which of the following are the media support carrier properties needed for MBBR process design calculations.
 - a. specific surface area (sq m/cu m) and density
 - b. specific surface area (sq m/cu m) and void ratio
 - c. specific gravity and void ratio
 - d. void ratio and specific weight

7. What would the required carrier surface area be (in sq m) for a BOD loading rate of 125,300 g BOD/d and a design SALR of 6 g/sq m/day?

- a. 16,707
- b. 20,883
- c. 18,158
- d. 751,800

8. In an anoxic or anaerobic MBBR process, the carrier support media are typically kept suspended by which of the following?

- a. a coarse bubble diffused air system
- b. pumped recirculation of the liquid containing the media
- c. a mechanical mixing system
- d. a fine bubble diffused air system

9. Which of the following would be the correct units for the surface area loading rate (SALR) for a nitrification MBBR reactor?

- a. g BOD/d/sq m
- b. g NO₃-N/d/sq m
- c. g NH₃-N/d/sq m
- d. g COD/d/sq m

10. Which of the following is a typical design value of SALR for 90-95% removal of BOD₇ at 15°C (in g/sq m/d) in a single stage MBBR reactor?

- a. 15
- b. 6
- c. 25
- d. 7.5

11. What would be the required MBBR tank volume for a required carrier volume of 40.2 cu m and 50% carrier fill?

- a. 80.4 cu m
- b. 20.1 cu m
- c. 70.2 cu m
- d. 40.2

12. What would be the volume of liquid in a MBBR reactor with tank volume = 2308 cu ft, carrier volume = 925 cu ft, and carrier void % = 50%.

- a. 1752 cu ft
- b. 1802 cu ft
- c. 1845 cu ft
- d. 1937 cu ft

13. How will the total tank volume requirement for a two-stage BOD removal MBBR system typically compare with the tank requirement for a single stage BOD removal system treating the same wastewater flow?

- a. The two-stage process will typically require less total tank volume.
- b. The two-stage process will typically require slightly more total tank volume.
- c. The two-stage process will typically require about the same total tank volume.
- d. The two-stage process will typically require about double the total tank volume.

14. The BOD loading rate to a MBBR nitrification process should meet which of the following requirements?

- a. BOD load > 0.5 g/sq m/d
- b. BOD load < 0.3 g/sq m/d
- c. BOD load < 0.5 g/sq m/d
- d. BOD load = 0.6 g/sq m/d

15. Which of the following describes the proper order for the BOD removal reactor and the nitrification reactor in a MBBR denitrification process?
- a. The BOD removal reactor will always be after the nitrification reactor.
 - b. The BOD removal reactor will only be before the nitrification reactor in a pre-anoxic denitrification process.
 - c. The BOD removal reactor will always be before the nitrification reactor.
 - d. The BOD removal reactor will only be after the nitrification reactor in a post-anoxic denitrification process.
16. In a pre-anoxic MBBR denitrification process, which of the following streams brings nitrate into the anoxic tank?
- a. The primary effluent entering the anoxic tank.
 - b. A recycle flow from the BOD removal reactor effluent.
 - c. Recycled secondary sludge.
 - d. A recycle flow from the nitrification reactor effluent.
17. Which of the following is the proper set of conditions for which pre-anoxic denitrification is suitable.
- a. $C/N < 4$ or target % Removal of N $> 75\%$
 - b. $C/N > 4$ and target % Removal of N $< 75\%$
 - c. $C/N > 4$ and target % Removal of N $> 75\%$
 - d. $C/N < 4$ and target % Removal of N $< 75\%$
18. Which of the following is true regarding the alkalinity requirement for a post-anoxic denitrification MBBR process in comparison with the alkalinity requirement for a BOD removal and nitrification MBBR process treating the same wastewater flow?
- a. The required alkalinity addition will be the same for both processes.
 - b. The post-anoxic denitrification process will require more alkalinity addition.
 - c. The post-anoxic denitrification process will require nearly twice as much alkalinity addition.
 - d. The post-anoxic denitrification process will require less alkalinity addition.
19. Which of the following are the user inputs needed to calculate the design value of the SALR (surface area loading rate) for a single stage nitrification MBBR reactor using the procedure described in this course?
- a. influent ammonia conc., design minimum temperature, and D.O. conc. in the reactor
 - b. target effluent ammonia conc., design minimum temperature, and D.O. conc. in the reactor
 - c. influent ammonia conc., design maximum temperature, and D.O. conc. in the reactor
 - d. target effluent ammonia conc., design maximum temperature, and D.O. conc. in the reactor
20. Which of the following MBBR processes requires that an external carbon source be added.
- a. post-anoxic denitrification
 - b. single stage nitrification
 - c. pre-anoxic denitrification
 - d. two-stage BOD removal and nitrification

[Purchase this course on Suncam.com](http://Suncam.com)