

Operator Quiz Test No. 117 – Mean Cell Residence Time

The following questions are designed for trainees as they prepare to take the ABC wastewater operator test. It is also designed for existing operators to test their knowledge. Each issue of *Clear Waters* will have more questions from a different section of wastewater treatment. Good luck!

- The Mean Cell Residence time is:
 - An expression of the average time, in seconds, that a microorganism will spend in the suspended solids process.
 - An expression of the average time, in hours, that a microorganism will spend in the activated sludge process.
 - An expression of the average time, in minutes, that a microorganism will spend in the settleable solids process.
 - An expression of the average time, in days, that a microorganism will spend in the activated sludge process.
- Calculate the total volume, in cubic feet, of a secondary treatment facility consisting of the following:
Sixteen (16) rectangular aeration tanks measuring 160 ft x 30 ft x 15 ft.
Four (4) final clarifier tanks, 15 ft deep with a 130 ft diameter.
 - 1,947,990 cu. ft.
 - 1,152,000 cu. ft.
 - 270,998 cu. ft.
 - 198,997 cu. ft.
- Using the information from Question Number 2, calculate the Secondary Treatment volume, in gallons:
 - 8,616,960 gal
 - 14,570,965 gal
 - 2,027,065 gal
 - 1,005,000 gal
- Calculate an aeration system mixed liquor suspended solids, in mg/L, based on the following data:
Crucible weight with filter: 25.000 grams
Crucible weight with filter and dry solids 25.085 grams
Sample Volume: 25 mL
 - 3,400 mg/L
 - 2,500 mg/L
 - 2,125 mg/L
 - 8,500 mg/L
- Calculate the total suspended solids of an aeration system, in pounds, based on the following information:
Aeration Basin volume: 14 MG
Aeration Basin MLSS: 3,500 mg/L
Aeration System flow: 30 MGD
 - 408,600 lbs
 - 1,400,700 lbs
 - 366,500 lbs
 - 785,400 lbs
- Calculate the total amount wasted from an aeration system based upon the following information:
Wasting rate: 0.55 MGD
Return Activated Sludge concentration: 7,000 mg/L
Aeration Influent BOD: 65 mg/L
Aeration Influent flow: 30 MGD
 - 107,200 lbs
 - 115,500 lbs
 - 32,100 lbs
 - 28,800 lbs
- Calculate the Final Effluent suspended solids, in pounds, from the following information:
Effluent suspended solids concentration: 5.0 mg/L
Effluent BOD Concentration: 8.0 mg/L
Effluent Flow: 30 MGD
Final Clarifier detention time: 1.5 hours
 - 1,251 lbs
 - 2,002 lbs
 - 1,122 lbs
 - 1,795 lbs
- Calculate the MCRT from the following data:
Mixed liquor suspended solids concentration: 3,500 mg/L
RAS concentration: 5,000 mg/L
Wasting Rate: 0.25 MGD
Final Effluent suspended solids: 2.5 mg/L
Aerator volume: 1.0 MG
Final Clarifier Volume: 1.0 MG
Final Effluent Flow: 2.0 MGD
 - 3.1 days
 - 2.8 days
 - 8.7 days
 - 5.6 days
- A 30-minute test settles out to 250 mL in a 1,000-mL cylinder. This result is indicative of the amount of sludge settling in the final clarifiers. What is the Return Sludge Flow Ratio based on this test?
 - 0.25
 - 0.33
 - 0.67
 - 0.75
- Estimate the Return Sludge Rate using the answer from Question Number 9 and the data below:
Flow to aeration system from primary clarifiers: 9.0 MGD
 - 0.99 MGD
 - 1.98 MGD
 - 2.97 MGD
 - 3.96 MGD

Answers from page 61: 1 D, 2 A, 3 B, 4 A, 5 A, 6 C, 7 A, 8 D, 9 B, 10 C

For those who have questions concerning operator certification requirements and scheduling, please contact Tanya May Jennings at 315-422-7811 ext. 4, tmj@nywea.org, or visit www.nywea.org/OpCert.