

# Operator Quiz Test No. 110 – Rotating Biological Contactor

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!

- Use the following data to determine the organic loading rate of a trickling filter: rock media 5' deep, 160' diameter, 8.0 mgd, 110 mg/L BOD primary effluent:
  - 73 lbs/day/1000 ft<sup>3</sup>
  - 9.17 lbs/day/1000 ft<sup>3</sup>
  - 875 lbs/day/1000 ft<sup>3</sup>
  - 11.7 lbs/day/1000 ft<sup>3</sup>
- A trickling filter with a hydraulic loading rate of 75 gal/day/ft<sup>2</sup> would be considered what type of trickling filter?:
  - High rate filter
  - Roughing filter
  - Standard rate filter
  - Tertiary filter
- Determine the hydraulic loading rate of a trickling filter using the following specifications: 6,250 gallons per minute, 140' diameter, 6' deep:
  - 1585 mgd/ft<sup>2</sup>
  - 585 gpd/ft<sup>2</sup>
  - 975 gpm/ft<sup>2</sup>
  - 115 gph/ft<sup>2</sup>
- All of the following are types of drive assemblies used to rotate an RBC, except:
  - Motor with chain drive
  - Motor with direct shaft drive
  - Air drive
  - Magnetic drive
- What is the organic loading rate on a rotating biological contactor with the following data: 50,000 gpd, 125 mg/L influent BOD, surface area of 28,000 ft<sup>2</sup>?:
  - 0.0019 lbs/day/1000ft<sup>2</sup>
  - 1.86 lbs/day/1000ft<sup>2</sup>
  - 0.0019 lbs/day/1000ft<sup>3</sup>
  - 1.86 lbs/day/1000ft<sup>3</sup>
- When the temperature of the influent to a trickling filter is warmer than ambient air, the air will:
  - Flow down through the media
  - Flow up through the media
  - Recirculate throughout the media
  - Air temperature compared to influent temperature has no bearing on air flow
- What is the purpose of the under drain system in a trickling filter?:
  - Controls wastewater flow to the filter media
  - Distributes flow evenly to the filter media
  - Collects untreated wastewater and distributes it to top of filter
  - Collects treated wastewater and permits air flow to filter media
- voids between the filter media in a trickling filter:
  - Must be kept open to allow sloughing of biology and proper air flow
  - Must be kept plugged to allow proper detention time of wastewater
  - Must be kept plugged to allow for retention of biology in the filter
  - Must be kept open to allow for visual inspections of filters
- By controlling the organic strength of wastewater into a trickling filter, an operator can directly control:
  - The amount of filter flies breeding
  - The thickness of biological buildup
  - The amount of wastewater flow into the filter
  - The amount of inorganic materials treated
- Of the following, which describes the best rotating speed in a rotating biological contactor (RBC):
  - 10 rpm and is adjusted based on media diameter
  - A speed rate which shears off growth allowing for constant hungry growth to develop
  - A speed which coincides with incoming flow; higher flow means faster speed
  - A slow to nearly stopped speed which allows biomass to stay submerged in wastewater
- The best observed characteristic of biomass in an RBC can be described as:
  - Being white in appearance denoting special bacteria are treating sulfur compounds
  - Being black in appearance denoting biomass effectively using dissolved oxygen in treatment
  - Being brown to grey in color, shaggy in appearance and uniformly covering the media
  - Being brown to grey in color, smelling of sulfide and sloughing off, exposing many bare spots
- A small community has a wastewater plant with an RBC system and experiences a high flow during the day and very low flow during the night. Which of the following is the most true statement describing the best operational parameters?:
  - High loading during the day provides the biomass food, RBC experiences sloughing due to low loading at night. Influent flows should be throttled during the peak times making use of an equalization tank, and secondary flows should be recycled at night.
  - High flows during the day provide a diluted influent and low flows during the night provide a concentrated influent. Secondary flows should be recycled at a high rate during the day and reduced during the night.
  - These flow parameters are normal flows for an RBC system. The operator should make very small adjustments throughout the day and night
  - A flow equalization tank should be installed in the plant and only used when flows are consistent throughout the day and night.

*This quiz material was compiled from Vol. 17 of Operation of Wastewater Treatment Plants, OWP.*

*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](mailto:tmj@nywea.org), or visit [www.nywea.org/OpCert](http://www.nywea.org/OpCert).*

ANSWERS: 1 A, 2 C, 3 B, 4 D, 5 B, 6 B, 7 D, 8 A, 9 B, 10 B, 11 C, 12 A