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- The basin in a water plant measure 60 feet long by 40 feet wide by 8 feet deep. The flow through this plant is 4.1 cuft/sec. What is the detention time?
 - 1 hour 18 minutes
 - 144 minutes
 - *c) 449 minutes
 - d) 2 hours 24 minutes
 - Calculate the weir overflow rate if the flow is 2.3cuft/sec and the radius of the weir is 29 feet.
 - *a) 5.67gpm/ft of weir
 - b) 8.50gpm/ft of weir
 - c) 11.34gpm/ft of weir
 - d) 17.01gpm/ft of weir
 - A circular clarifier receives a flow of 5 MGD. If the clarifier is 90 ft. in diameter and is 12 ft. deep, what is: a) the hydraulic/surface loading rate, b) clarifier detention time in hours, and c) weir overflow rate?
 - Hydraulic/surface loading rate:

$$\text{Clarifier hydraulic loading} \left(\frac{gpd}{ft^2} \right) = \frac{\frac{5MG}{day} * \frac{10^6 gal}{MG}}{0.785 * 90^2 ft^2} = \boxed{786 gpd/ft^2}$$
 - Clarifier detention time:

$$\text{Clarifier detention time (hr)} = \frac{\text{Clarifier volume}(cu.ft \text{ or } gal)}{\text{Influent flow (cu.ft or gal)/hr}}$$

$$\text{Clarifier detention time (hr)} = \frac{(0.785 * 90^2 * 12) ft^3}{\frac{5MG}{day} * \frac{10^6 gal}{MG} * \frac{ft^3}{7.48 gal} * \frac{day}{24 hrs}} = \boxed{2.7 hrs}$$
 - Overflow rate:

$$\text{Weir overflow rate} \left(\frac{gpd}{ft} \right) = \frac{\frac{5MG}{day} * \frac{10^6 gal}{MG}}{3.14 * 90 ft} = \boxed{17,692 gpd/ft}$$
 - Calculate the weir loading for a sedimentation tank that has an outlet weir 480 ft long and a flow of 5 MGD.
 - a. 9,220 gpd/ ft
 - b. 9,600 gpd/ ft
 - c. 9,920 gpd/ ft
 - *d. 10,420 gpd/ft

Solution:

$$\text{Weir overflow rate} \left(\frac{gpd}{ft} \right) = \frac{\frac{5MG}{day} * \frac{10^6 gal}{MG}}{480 ft} = \boxed{10,417 gpd/ft}$$

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5. A rectangular sedimentation tank is 85 feet long, 35 feet wide, and 14 feet deep including 3 feet of freeboard. Flow to this tank is 2.3 MGD. Calculate the surface loading to this tank in gpd per ft^2 .
- a. 318 gpd/ ft^2
 - *b. 773 gpd/ ft^2
 - c. 845 gpd/ ft^2
 - d. 1932 gpd/ ft^2