Lecture 3: Water Treatment- Coagulation

3.2. Design of the coagulation tank

(a) Turbine chamber (b) Propeller chamber (c) Double-compartment turbine chamber

(d) Double-compartment turbine chamber (e) Paddle chamber (f) In-line blender

Power requirements:. Power required for turbulent mixing is traditionally based on the velocity gradient or G values proposed by Camp and Stein (1943). The mean velocity gradient G for mechanical mixing is:

$$G = \left(\frac{P}{\mu V}\right)^{1/2}$$

G= velocity gradient, s^{-1};
P = Power input, W
V = Tank volume, m^3;
μ = Dynamic viscosity, (Pa.s)

- In practice, G values of 3000 to 5000/s are preferable for rapid mixing (ASCE and AWWA, 1990).

- t (time) generally 60 to 120 s.

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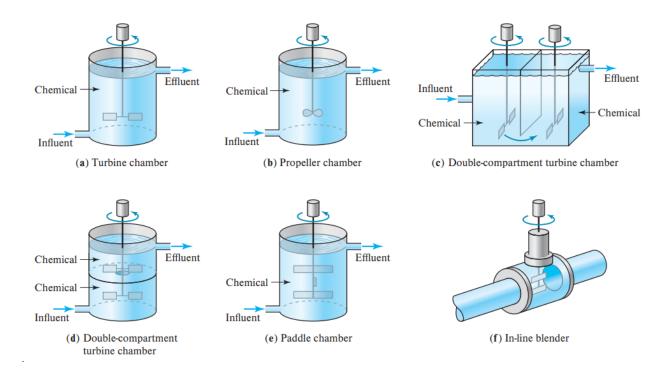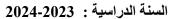اسم التدريسي : د. طارق جواد كاظم
المرحلة : الرابعة
السنة الدراسية : 2024-2023
عنوان المحاضرة:

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Example: A rapid mixing tank is 1mx1mx1.2m. The power input is 746 W (1 hp). Find

the G value at a temperature of 20 °C.

Example: A square rapid mixing basin with a depth equal to 1.5 times the width is to be designed for a flow of 10000 m^3/d. The velocity gradient is to be 3000 s^{-1}, the mixing time is 60 s. Determine the basin dimensions and the power required?