

Secondary Wastewater Treatment *(Aerated Lagoon)*

AERATED LAGOONS

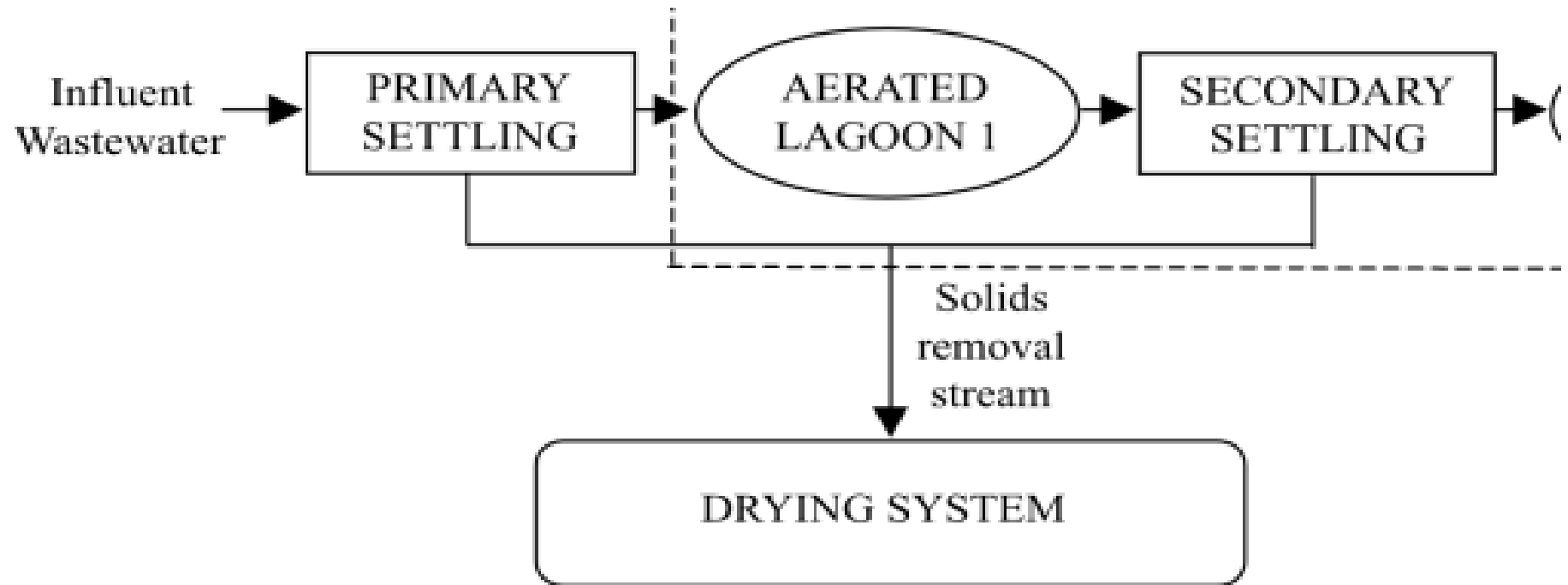
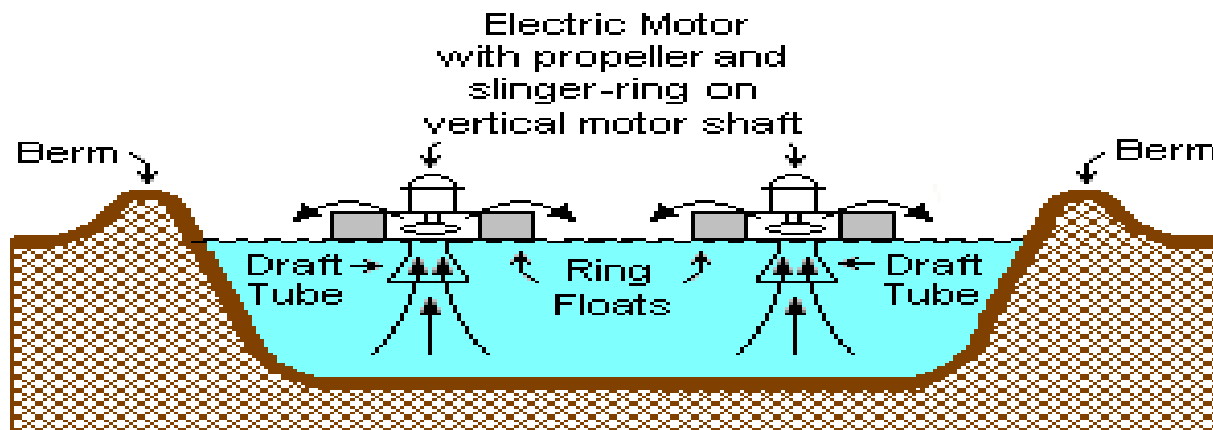


Figure 1: Process flowsheet for wastewater treatment plant at I

AERATED LAGOONS

- Aerated Lagoons are earthen basins in which wastewater is treated on a Flow Through Basis.
- Oxygen is supplied by means of surface or diffused aerators.
- Aerated Lagoon operates at low MLSS concentrations but with long retention time as compared to activated sludge process.
- In Aerated Lagoons sludge recycling is not employed.



A TYPICAL SURFACE – AERATED BASIN

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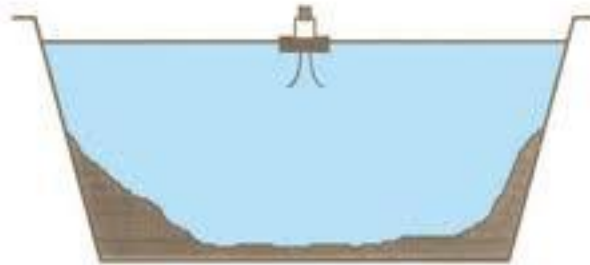


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TYPES:

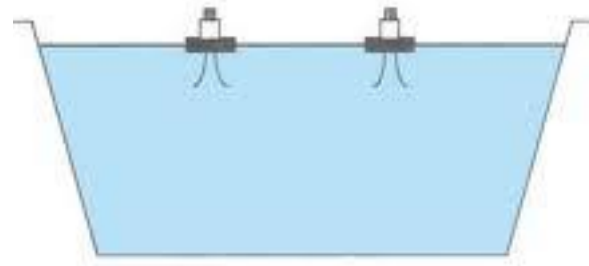
i. Partially Mixed (Facultative):

- Aeration done only to fulfill oxygen requirements, but not for maintaining the solids in suspension. Settled sludge decomposes anaerobically.



ii. Fully Mixed (Aerobic):

- Energy input satisfies the BOD and keeps the contents of the basin in suspension.



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Process Design Criteria/Considerations:

- Detention Time 4-7 days
- Depth 3-5 m
- Power Input 20 W/m³ of Lagoon volume
- Effluent quality can be estimated by using following formula

$$L = \frac{L_0}{1 + Kt}$$

- Reported overall values of K vary from 0.5 to 1.5 per

Temperature Correction

$$K_{T_2} = K_{T_1} (1.047)^{T_2 - T_1}$$

AERATED LAGOONS

Advantages:

- Require less area as compared to Waste stabilization ponds(WSP)
- Used for industrial wastewater treatment
- Low capital cost
- Easy to operate and maintain
- No skilled labour required
- Minimum mechanical equipment involved
- Negligible odour problem

Disadvantages;

- Poor fecal coliform removal as compared to WSP
- Needs final clarifier
- Sludge handling problem

Design of Aerated lagoon

Calculate area requirement of aerated lagoon to treat the flow of 8000 m³/day. If it is desired to achieved 90% removal efficiency under temperature of 30 °C, $K_{20}=1.0$ per day.

Design of Aerated lagoon

Calculate area requirement of aerated lagoon to treat the flow of $3.15 \text{ m}^3/\text{min}$ with the detention time of 6 days under the temperature of 40°C . Also calculate the removal efficiency , $K_{20}=0.5$ per day.