

TRAINING OF TRAINERS PROGRAMME ON CAPACITY DEVELOPMENT OF ETP OPERATORS

Promotion of Sustainability in the Textile and Garment Industry in Asia - FABRIC

Work Exercise WE-1

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- Calculate the dimensions of equalisation tank for a 1 MLD textile effluent.
- Calculate the dimension a primary clarifier for 100 m³/h flow.



**Q1: Calculate the dimensions of equalisation tank for a 1 MLD textile effluent.
Factory flow is 10 hrs/d, ETP Pumping is for 20 hrs/d**

Sl.No.	Parameter	Hint	Value	Unit
1.	Storage volume needed	= factory flow - ETP pumped flow in 10 hrs		m ³
2.	Buffer storage level to be maintained	(20% of total flow)		m ³
3.	Minimum water level to be maintained for homogenisation	(20% of total flow)		m ³
4.	Total effective volume needed			m ³
5.	Area needed if total effective depth is 3 m	effective volume/ depth		m ²
6.	Total dimension (length x breadth x depth)	Assume 0.5 m extra depth as free board		m

Q2: Calculate dimensions of circular primary clarifier for 100 m³/h flow

Surface Loading rate” 11 m³/1 m²

Steps:

Sl.No.	Parameter	Hint	Value	Unit
1.	Flow rate			m ³ /h
2.	Total surface area	Flow rate/1.1		m ²
3.	Radius of the tank	Surface area is πr^2		m
4.	Side water depth	(may assume 2.5 m)		m
5.	Total volume	Surface area x depth		m ³
6.	Retention time	Volume / flow rate		hrs
7.	Tank dimension (diameter x depth)			m

Q1: Calculate the dimensions of sludge drying bed for 10 m³/d of 3% sludge. Take drying time as 12 days

Steps:

<u>Sl.No.</u>	Parameter	Hint	Value	Unit
1.	Total quantity of sludge per day			m ³ /d
2.	Drying time			days
3.	Sludge drying volume needed	Sludge/d x drying time		m ³
4.	Sludge application depth	Take 0.3 m		m
5.	Area needed for sludge drying	drying volume/ application depth		m ²
6.	No. of beds			
7.	Area of each sludge drying bed,	Total area/no. of drying beds		m ²
8.	Dimensions of each bed (length x width x total depth)	media depth may be 0.7 m		m

Q2. Which is the most suitable mechanical sludge dewatering system for Bangladesh, Why?

Q1: Design an aeration tank for a 0.8 MLD (800 m³/d)ETP. Inlet BOD is 600 mg/l, take the F/M as 0.1 and MLSS concentration as 3000 mg/l

Sl.No.	Parameter	Hint	Value	Unit
1.	Flow rate			m ³ /d
2.	BOD load/d	BOD mg/l x flow rate ÷ 1000		Kg/d
3.	F/M			
4.	MLSS load needed	BOD load ÷ F/M		kg
5.	MLSS concentration			mg/l
6.	Volume of tank needed	MLSS load ÷ MLSS concentration		m ³
7.	Depth of aeration tank	Assume 5 m		m
8.	Area of the tank	Volume ÷ depth		M
9.	Dimensions of the tank (length x width x depth)			M
10.	Hydraulic retention time	Volume of tank/Flow rate		days

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