

Oxygen demand Calculation:

Required oxygen infusion rate: 0.4 kg-O₂/min

$$M_{O_2} = Q (S_o - S) - 1.42 P_{x,bio} + 4.57 Q (NO_x)$$

576 kg O₂ /d
24.00 kg O₂ /h

$$O_2 \text{ credit} = [2.8g \text{ O}_2 / g \text{ NO}_3\text{-N}] [(NO_x)\text{-N}_e](Q_o)$$

0.00 kg O₂ /d
0.00 kg O₂ /h

Net O₂ required 24.00 kg O₂ /h

Solubility: Amount of DO that distilled water can hold at a given temperature

Temp. (C)	Solubility (mg/L)
0	14.6
1	14.2
2	13.8
3	13.5
4	13.1
5	12.8
6	12.5
7	12.2
8	11.9
9	11.6
10	11.3
11	11.1
12	10.9
13	10.6
14	10.4
15	10.2
16	10.0
17	9.8
18	9.6
19	9.4
20	9.2
21	9.0
22	8.9
23	8.7
24	8.6
25	8.4
26	8.2
27	8.1
28	7.9
29	7.8
30	7.7

Air Blower Capacity Calculation:

Design parameters:

35 : Basin Max. Temp. C°

0 : m (z_b) - site elevation

0.52 : α

0.95 : β

0.9 : F

3.2 : Water Depth

2.7 : D_f

9.2 : C°S₂₀

7.559 : C°ST

17% : Efficiency

3.0 : DO mg/l

0.232 : M_f

$$C^{\circ}ST_{20^{\circ}} = [C^{\circ}S_{20}] [1 + d_c (D_f / P_a)]$$

16.69

$$P_b/P_a = \exp[-gM(z_b - z_a / RT)]$$

1.00

$$\rho_{P,T} = P M / RT$$

1.131 kg/m³

$$SOTR =$$

59.80 kg/h

$$\text{Air flowrate} = SOTR / [(E) (\rho \cdot M_f)]$$

1,341 m³/h

0% S. F. 1,341 m³/h

Air flow / diffuser 3.5 m³/h
No. diffuser need 383

take from catalog
Tube 63 mm
750 mm length