

## JunTai--Sewage Treatment Aerobic Tank Oxygen Demand Calculator

Blue block is the design datameter : be filled in

Brown: calculate process data

Red : last result for your process

### 1.Sewage Treatment Aerobic Tank--Basic data:

|  | m <sup>3</sup> /day     | m <sup>3</sup> / h         | m <sup>3</sup> /s   |   |
|--|-------------------------|----------------------------|---|---|
| 1、 Design water quantity Q                                       | 10000                   | 416.67                     | 0.12  |   |
| 2、 inlet/outlet BOD(mg/L)  | 142                     | 13                         |   |   |
| 3、 a' /b' /α/β   | 0.32                    | 0.1                        | 0.55  | 0.80  |
|  | kgO <sub>2</sub> /kgBOD | kgO <sub>2</sub> /kgMLSS·d | Aeration equipment in sewage and clear water Ratio of total oxygen transfer coefficient | The ratio of saturated DO concentration ratio |
| Domestic Sewage  | 0.42~0.53               | 0.188~0.11                 | 0.8~0.9   | 0.9~0.95                                      |
| Bleaching and dyeing wastewater                                  | 0.5~0.6                 | 0.07                       |   |   |
| Printing and dyeing wastewater                                   | 0.32                    | 0.10                       | 0.45~0.55   | 0.7~0.8                                       |
| Pulp and Paper   | 0.38                    | 0.09                       |   |   |
| Petrochemical  | 0.75                    | 0.16                       |   |   |
| 4、 aerator air release point from the water surface height H (m) |                         |                            | 4.7   |   |
| 5、 Water temperature in the aeration pool T                      |                         |                            | 35  |   |

### 2.Sewage Treatment Aerobic Tank--Oxygen Demand Calculation

|   |   |           |                |
|---|---|-----------|----------------|
| 1、 V (m <sup>3</sup> )  | $V=Q*\Delta BOD / (1000*Fw*Nw)$                                     | 6450.00   |                |
| 2、 Fw Sludge loading (kgBOD/kgMLVSS d)  |   | 0.1       | 0.1~0.3        |
| 3、 Nw sludge concentration (g/L)  |   | 2         | 1.5~3          |
| 4、 Residence time T(h)  |   | 15.48     |                |
| 5、 Oxygen demand O <sub>2</sub> (kgO <sub>2</sub> /d)                           | $O_2=Q*\Delta BOD*a' /1000+V*Nw*b'$                                 | 1702.8    |                |
| 6、 Pressure correction factor   | $P=Pb/0.206+Qt/42$  | 1.15      |                |
| 7、 Air release point at the absolute pressure (MPa)                             | $Pb=Pa+H/100$   | 0.148     | Pa=0.101       |
| 8、 Air escapes the surface of the pool when the percentage of oxygen in the gas | $Ot=21*(1-\epsilon) *100/[79+21*(1-\epsilon)]$                      | 18.08     |                |
| 9、 Oxygen utilization rate of ε aerator   |   | 0.17      |                |
| 10、 T °C in distilled water saturated DO value (mg / L) Cs (T)                  |   | 7         | 20°C/25°C/30°C |
|   |   |           | 9.17/8.4/7.6   |
| 11、 DO value to be maintained for normal operation of aeration tank (mg/L) Ct   |   | 2.5       |                |
| 12、 Calculation of oxygen demand in the standard state                          | $Oc=O_2*Cs_{20} / (\alpha*1.024^{(T-20)}) * (\beta*p*Cs_{(T)} -Ct)$ | 5228.22   |                |
| 13、 Total air supply of fan (m <sup>3</sup> /d)                                 | $Q=Oc / (0.28*\epsilon)$  | 109836.50 |                |
| 14、 Gas-Water ratio   |   | 10.98     |                |