

# Aeration and Sand Sedimentation Tank Calculator

Blue block is the design datameter : be filled in

Brown: calculate process data

Red : last result for your process

## 1.Aeration Equipment----Design parameters:

Design flow rate	Q	20000	m <sup>3</sup> /d		
Total coefficient of variation	K <sub>z</sub>	1.50			
Design maximum flow rate	Q <sub>max</sub>	30000	m <sup>3</sup> /d	0.35	m <sup>3</sup> /s

## 2.Aeration Equipment----calculation result

Total effective volume of the pool	V=Q <sub>max</sub> *t	45.83	m <sup>3</sup>		
Epidemic time at maximum design flow	t	2.20	min	1~3	
Water flow cross-section area	A=Q <sub>max</sub> /v <sub>1</sub>	4.34	m <sup>2</sup>		
Horizontal flow rate at maximum design flow	v <sub>1</sub>	0.08	m/s	0.06~0.12	
Total pool width	B=A/h <sub>2</sub>	2.17	m		
	Final take	2.20	m		
Design effective water depth	h <sub>2</sub>	2.00	m	2~3m	
Pool width per cell	b=B/n	2.20	m		
Pool width to depth ratio	b/h <sub>2</sub>	1.10		1~1.5	
Number of compartments	n	1.00	格		
Pool length	L=V/A	10.56	m		
	Final take	11.00	m		
Length to width ratio	L:b	5.00		Recommended aspect ratio 5: 1	
Total effective volume of pool	V	45.83	m <sup>3</sup>		
Cross-sectional area of water flow	A	4.34	m <sup>2</sup>		
Width of sand sedimentation tank opening	b <sub>1</sub> =2*h <sub>3</sub> *ctga+b <sub>2</sub>	0.32	m		
Height of sinker	h <sub>3</sub>	0.10	m		
Angle between the sloping wall of the sinkhole and the horizontal plane	a	60.0	°		
Width of the bottom of the sinkhole	b <sub>2</sub>	0.2	m		
Volume of each sedimentation tank	V <sub>1</sub> =(b <sub>1</sub> +b <sub>2</sub> )/2*h <sub>3</sub> *L	0.27	m <sup>3</sup>		
Total volume required for sand sedimentation tank	V=(Q <sub>max</sub> *x*T*3600)/(K <sub>z</sub> *10 <sup>6</sup> )	1.20	m <sup>3</sup>		
Sand sedimentation volume	x	30.00	m <sup>3</sup> /m <sup>3</sup>	Sewage	
Sand injection time	T	48.00	h	≤48h	
Volume required for each sedimentation tank	V'=V/n	1.20	m <sup>3</sup>		
Height of sloping part of tank bottom	h <sub>4</sub> =i*((b-b <sub>1</sub> )/2)	0.06	m		
Over height	h <sub>1</sub>	0.30	m		
Slope of pool bottom	i	0.06			
Total pool height	H=h <sub>1</sub> +h <sub>2</sub> +h <sub>3</sub> +h <sub>4</sub>	2.46	m		
Air volume required per hour	q=d*Q <sub>max</sub> *3600	250.0	m <sup>3</sup> /h	4.2	m <sup>3</sup> /min
Air volume required for 1m <sup>3</sup> sewage	d	0.2	m <sup>3</sup> /m <sup>3</sup>		