

Table.S6. Statistical table of main structures and equipment

Statistics of major structures			Statistics of major equipment		
Name	Specification	Quantity	Name	Specification	Quantity
Comprehensive area	$3.2 \times 1.5 \times 1.5\text{m}$	1	Lift pump	$Q = 8.1\text{m}^3/\text{h}$, $H = 5\text{m}$, $N = 0.75\text{kw}$	2
Cistern	$0.3 \times 0.7 \times 1.5\text{m}$	1	Reaction agitator	$N = 0.5\text{kw}$	3
Demulsification and Flocculation tank	$1 \times 0.7 \times 1.5\text{m}$	1	Sludge pump	$Q = 18\text{m}^3/\text{h}$, $N = 0.75\text{Kw}$	2
Sedimentation tank	$0.5 \times 0.7 \times 1\text{m}$	1	Mud suction machine	$N = 3.7\text{kw}$	1
Ammonia nitrogen stripping tank	$1 \times 0.7 \times 1.5\text{m}$	1	Reagent configuration dosing system	$N = 0.37\text{kw}$	4
Regulating slot	$0.3 \times 0.7 \times 1.5\text{m}$	1	Sludge belt filter press	Bandwidth 0.5m , $N = 1\text{kW}$	1
Fenton oxidation tank	$1 \times 0.7 \times 1.5\text{m}$	1	Reflux pump	$Q = 11.1\text{m}^3/\text{h}$, $H = 7\text{m}$, $N = 0.37\text{kw}$	1
Sludge disposal area	$0.5 \times 0.3 \times 1.5\text{m}$	1	Reagent delivery pump	$Q = 12\text{m}^3/\text{h}$, $H = 8\text{m}$, $N = 0.75\text{kw}$	4
Sludge dewatering area	$1 \times 0.3 \times 1.5\text{m}$	1	Air compressor	$Q = 0.18\text{m}^3/\text{h}$, $H = 50\text{m}$, $N = 0.55\text{kw}$	1
Transmembrane area	$1 \times 0.3 \times 1.5\text{m}$	1	Aeration system	$N = 1\text{kw}$	1
Neutralization sedimentation tank	$0.5 \times 0.7 \times 1\text{m}$	1	Reverse osmosis membrane device	$N = 0.12\text{kw}$	1
Detection tank	$0.5 \times 0.3 \times 1.5\text{m}$	1	Drainage pump	$Q = 11.1\text{m}^3/\text{h}$, $H = 7\text{m}$, $N = 0.37\text{kw}$	1

Table.S7. Detailed calculation of operating costs

Unit process	Electricity cost		Chemical cost				Operating costs (US\$/m ³)
	Major equipment	(US\$/m ³)	Drug name	Dosage (kg/ m ³)	Quantity (US\$/kg)	(US\$/m ³)	
DF	Lift pump; Agitator; Sludge pump; Reagent delivery pump; Mud suction machine	0.37	PAM	3.0	0.68	2.04	5.55
			PAC	6.0	0.13	0.78	
			10%NaClO	20.0	0.07	1.40	
			CaCl ₂	6.0	0.24	0.96	
			NaOH	0.02	0.50	0.01	
AS	Agitator; Aeration system; Air compressor	0.82					0.83
FO	Agitator; Sludge pump; Reagent delivery pump; Mud suction machine	0.13	30%H ₂ O ₂	20	0.10	2.00	2.28
			FeSO ₄ •7H ₂ O	6.0	0.02	0.12	
			NaOH	0.04	0.50	0.02	
			H ₂ SO ₄	0.04	0.25	0.01	
RO	Reverse osmosis membrane device; Drainage pump; Reflux pump	0.06	NaOH	0.02	0.50	0.01	0.07