



Industrial Service Report

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Service Item : The Measurement of Oxygen Transfer Efficiency for KNH
Plate Diffuser

Client

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The Measurement of Oxygen Transfer Efficiency for KNH Plate Diffuser

Trustor : KNH Enterprise Co., Ltd

Test Date : 2009.06.25~26

Sample : Plate Diffuser(KNH)

Report Date : 2009.07.07

Test Item	Method	Result	Remark
Standard Oxygen Transfer Efficiency (SOTE)	<ul style="list-style-type: none"> For the tank with 4m height Reference : ASCE Oxygen Transfer Standards Tank dimensions : 0.35m(L) × 0.35m(W) × 4.66m(H) Testing depth : 4 m Calculation : $\frac{dC}{dt} = K_L \frac{A}{V} (C_s - C) = K_L a (C_s - C)$ <p>dC/dt : the rate of change of concentration with time K_L : the oxygen transfer coefficient A : the gas-liquid interface area V : the volume of liquid being oxygenated a : the interfacial area per unit volume C_s : the gas saturation concentration in the liquid C : the oxygen concentration in the liquid</p>	<p>As the attachment shows, after calculation based on the DO curve, the SOTE with the air flow within 60~30 L/min is as following:</p> <p>1. KNH diffuser : 18.3~25.4%</p> <p>2. Normal diffuser : 17.4~21.8%</p>	



Attachment :

SOTE test summary of KNH plate diffuser :

Category (-)	Air Flow (Lpm)	KLa20 (1/h)	SOTE (%)		Remark
KNH Diffuser	60	35.1	18.3	18.3~25.4	*60~30Lpm
	50	32.8	20.4		
	40	29.8	23.2		
	30	24.4	25.4		
	20	17.2	26.9		
Normal Diffuser	60	33.5	17.4	17.4~21.8	*60~30Lpm
	30	21.0	21.8		



Photo 1. The in-situ testing installation for the measurement of oxygen transfer



Test Result 1-SOTE of KNH plate diffuser

Date : 2009/6/25
 Sample : KNH plate diffuser
 Testing Liquit : Tap water
 Tank dimensions : 0.35m(L) × 0.35m(W) × 4.66m(H)

(1) Operating condition :

Air flow(L/min)		60	50	40	30	20
Depth(m)		4	4	4	4	4
Water Temp.(°C)	Before	32.9	32.8	33.6	33.2	33.2
	After	32.6	33.2	33.4	33.1	33.0
	Avg.	32.8	33.0	33.5	33.2	33.1
Operating Condition Temp.(°C)	Before	32.6	34.1	33.2	31.2	33.2
	After	32.0	34.3	33.4	31.1	33.0
	Avg.	32.3	34.2	33.3	31.2	33.1

(2) DO curve :

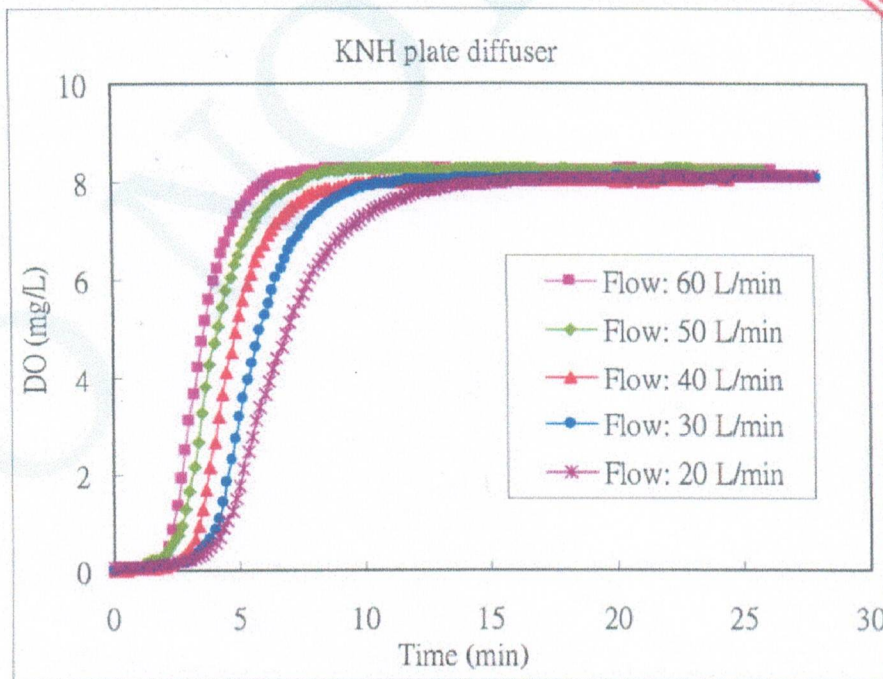


Figure 1. The DO curve variation of KNH plate diffuser



Test Result 2-SOTE of normal plate diffuser

Date : 2009/6/26
 Sample : Normal plate diffuser
 Testing Liquit : Tap water
 Tank dimensions : 0.35m(L) × 0.35m(W) × 4.66m(H)

(1) Operating condition :

Air flow(L/min)		60	30
Depth(m)		4	4
Water Temp.(°C)	Before	33.5	33.8
	After	33.7	33.9
	Avg.	33.6	33.9
Operating Condition Temp.(°C)	Before	34.8	35.2
	After	34.2	34.5
	Avg.	34.5	34.9

(2) DO curve :

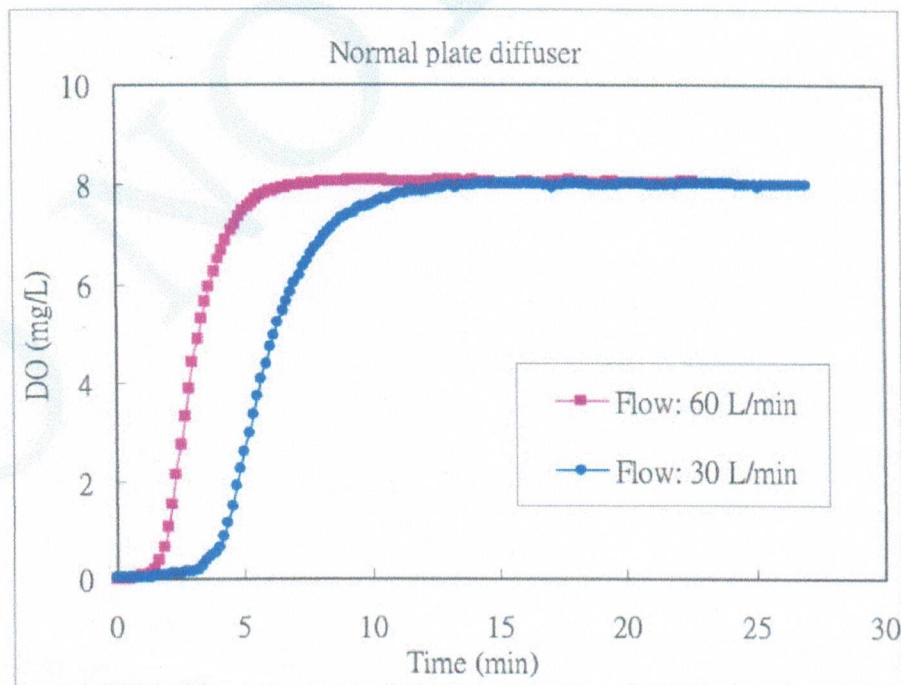


Figure 2. The DO curve variation of normal plate diffuser