

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: Colorite [AeroTube] - Diffused Air - 1 HP

DATE: 4-Jan-07

RUN: 4 - 15,000 mg/L NaCl

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	Initial	Mid Point	Final		
Barometric Pres. (PSIA)	14.284	14.284	14.284	C' Air Flow Device 1 (Annubar)	1,519.57
(mm Hg)	738.70	738.70	738.70	Air Flow Device 1 (SCFM)	89.55
Ambient Temperature (°F)	63.10	63.10	63.10	C' Air Flow Device 2 (Orifice)	249.41
Relative Humidity (%)	62%	62%	62%	Air Flow Device 2 (SCFM)	89.53
Line Pressure (PSIG)	2.480	2.505	2.505	TDS Water Density @ 20°C (kg/m³)	1,010.09
(In. Hg)	5.05	5.10	5.10	Standard Density @ 20°C (kg/m³)	998.23
Line Temperature (°F)	96.00	96.00	95.00	Temp. Correction Factor (τ)	1.22
ΔH Air Flow Dev. 1 (Annubar)	0.120	0.110	0.115	Pressure Correction Factor (Ω)	0.97
ΔH Air Flow Dev. 2 (Orifice)	4.300	4.250	4.250	Average Air Flow (SCFM)	89.54
C _{sm} T (Standard Methods, mg/l at 0 TDS))		11.102	β (C ^{*20TDS} /C ^{*20CW})	Effective Depth Correction (f)	0.35
C* ₂₀ (mg/L at 0 TDS)		9.292	0.897	Headloss (In. H ₂ O)	15.00
Water Temp. (°C)	10.66	10.73	10.74	C* (mg/l)	9.89
Orifice Diameter (in)		1.840		C _{sm} T (Standard Methods, mg/l at test TDS))	9.96
Number Of Aeration Devices		217		C* ₂₀ (mg/L at Test TDS)	8.33
Side Water Depth (ft)		4.00	(1.22 m)	Tank Volume (Ft³)	1,385.4
Air Release Depth (ft)		2.13	(0.65 m)	(Gallons)	10,363.8
Tank Length (ft)		0.00	(0.00 m)	(m³)	39.2
Tank Width (ft)		0.00	(0.00 m)	(Million Pounds)	0.087
Tank Diameter (ft)		21.00	(6.40 m)	#Na ₂ SO ₃ @ 350% Stoichiometric	23.90
Gear Reducer or Belt Efficiency		100.0%		Cobalt Concn. (mg/l)	0.100
Motor Efficiency		85.0%		Grams Cobalt Chloride	16.4
Blower HP _{wire}		1.16	(0.87 kw)	Blower HP _{motor}	0.99
Total HP _{wire} av.		1.16	(0.87 kw)	Total HP _{motor} av.	0.99
Actual Air Flow (ACFM)		82.95		TDS (mg/L)	15,640.00

NON-LINEAR REGRESSION RESULTS

Probe	K _{La} r	K _{La} 20	SOTR	SOTR/Dev	SOTE	SAE _{wire}	C*	Std. Err.
1	10.44	13.01	10.56	0.05	11.38	9.09	9.89	0.0594
2	10.33	12.88	10.53	0.05	11.35	9.07	9.96	0.0990
3	10.25	12.78	10.38	0.05	11.19	8.94	9.90	0.0642
4	10.79	13.45	10.84	0.05	11.69	9.34	9.82	0.1329
avg.	10.45	13.03	10.58	0.05	11.40	9.11	9.89	0.0889
Avg	10.39	12.94	10.51	0.05	11.33	9.05	9.89	Exclude Max&Min
Corrected	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-WHP		

OXYGEN TRANSFER									
Total SCFM:	89.5	143.954	:Nm ³ /Hr	42.258	L/s	#O ₂ /Hr:	10.57	4.794	:KgO ₂ /Hr
SCFM/Diff.:	0.41	0.663	:Nm ³ /hr/Diff			#O ₂ /Hr/Diff.:	0.05	0.022	:KgO ₂ /Hr/Diff.
SCFM/KCF:	64.6	3.669	:Nm ³ /hr/m ³			#O ₂ /Day:	253.6	115.0	:KgO ₂ /Day
Total ICFM:	97.4	45.97	L/s		#O ₂ /Day/1000 Ft ³ :	183	2.93	:KgO ₂ /Day/m ³	

LINEAR REGRESSION RESULTS

Probe	K _{La} r	K _{La} 20	SOTR	SOTR/Dev	SOTE	SAE _{wire}	C*	Corr. Coeff.
1	10.45	13.03	10.56	0.05	11.39	9.10	9.88	0.9993
2	9.92	12.36	10.14	0.05	10.93	8.73	9.99	0.9984
3	10.41	12.98	10.50	0.05	11.32	9.04	9.86	0.9987
4	11.03	13.75	11.04	0.05	11.90	9.50	9.78	0.9962
avg.	10.45	13.03	10.56	0.05	11.38	9.09	9.88	0.9981
Avg	10.43	13.00	10.54	0.05	11.36	9.07	9.87	Exclude Max&Min
Corrected	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

EUROPEAN STANDARD

Probe	K _{La} r	K _{La} 20	SOTR	SOTR/Dev	SAE	C*
1	10.44	13.02	4.75	0.02	5.48	9.89
2	10.13	12.62	4.63	0.02	5.35	9.96
3	10.33	12.88	4.70	0.02	5.42	9.90
4	10.91	13.60	4.92	0.02	5.68	9.82
avg.	10.45	13.03	4.75	0.02	5.48	9.89
Avg	10.39	12.95	4.72	0.02	5.45	9.89
Corrected	/hr	/hr	kg O ₂ /hr		kg O ₂ /hr-kw	mg/L

OXYGEN TRANSFER AT TEST 15640 mg/L TDS CONCENTRATION

Average	K _{La} r	K _{La} 20	OTR	OTR/Dev	OTE	AE _{wire}	C*
	10.454	13.03	9.39	0.04	10.12	8.09	9.89
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw	