

ASCE OXYGEN TRANSFER DETERMINATION

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

DATE: 5-Jan-07

RUN: 5 - 20,000 mg/L NaCl

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	Initial	Mid Point	Final		
Barometric Pres. (PSIA)	14.180	14.176	14.174	C' Air Flow Device 1 (Annubar)	1,513.23
(mm Hg)	733.30	733.10	733.00	Air Flow Device 1 (SCFM)	87.80
Ambient Temperature (°F)	65.70	65.80	65.80	C' Air Flow Device 2 (Orifice)	248.37
Relative Humidity (%)	76%	75%	74%	Air Flow Device 2 (SCFM)	87.90
Line Pressure (PSIG)	2.530	2.554	2.554	TDS Water Density @ 20°C (kg/m³)	1,013.22
(In. Hg)	5.15	5.20	5.20	Standard Density @ 20°C (kg/m³)	998.23
Line Temperature (°F)	105.00	104.00	100.00	Temp. Correction Factor (τ)	1.20
ΔH Air Flow Dev. 1 (Annubar)	0.120	0.110	0.110	Pressure Correction Factor (Ω)	0.97
ΔH Air Flow Dev. 2 (Orifice)	4.250	4.200	4.200	Average Air Flow (SCFM)	87.85
C _{sm} T (Standard Methods, mg/l at 0 TDS)		10.881	β (C ^{*20TDS} /C ^{*20CW})	Effective Depth Correction (f)	0.35
C* ₂₀ (mg/L at 0 TDS)		9.294	0.872	Headloss (In. H ₂ O)	15.00
Water Temp. (°C)	11.55	11.57	11.62	C* (mg/l)	9.36
Orifice Diameter (in)		1.840		C _{sm} T (Standard Methods, mg/l at test TDS))	9.49
Number Of Aeration Devices		217		C* ₂₀ (mg/L at Test TDS)	8.11
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)	0.088
Tank Diameter (ft)		21.00	(6.40 m)	#Na ₂ SO ₃ @ 840% Stoichiometric	54.44
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}		1.15	(0.86 kw)	Blower HP _{motor}	0.98
Total HP _{wire} av.		1.15	(0.86 kw)	Total HP _{motor} av.	0.98
Actual Air Flow (ACFM)		83.04		TDS (mg/L)	19,779.00

NON-LINEAR REGRESSION RESULTS

Probe	K _{La} r	K _{La} 20	SOTR	SOTR/Dev	SOTE	SAE _{wire}	C*	Std. Err.
1	10.57	12.91	10.51	0.05	11.55	9.13	9.36	0.0577
2	12.45	15.20	12.35	0.06	13.57	10.73	9.34	0.0460
3	11.50	14.04	11.53	0.05	12.67	10.01	9.44	0.0580
4	11.38	13.90	11.25	0.05	12.36	9.77	9.30	0.0736
avg.	11.47	14.01	11.41	0.05	12.54	9.91	9.36	0.0588
Avg	11.44	13.97	11.36	0.05	12.48	9.87	9.35	Exclude Max&Min
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-WHP		

OXYGEN TRANSFER									
Total SCFM:	87.8	141.233	:Nm ³ /Hr	41.459	L/s	#O ₂ /Hr:	11.46	5.198	:KgO ₂ /Hr
SCFM/Diff.:	0.40	0.651	:Nm ³ /hr/Diff			#O ₂ /Hr/Diff.:	0.05	0.024	:KgO ₂ /Hr/Diff.
SCFM/KCF:	63.4	3.600	:Nm ³ /hr/m ³			#O ₂ /Day:	275.0	124.7	:KgO ₂ /Day
Total ICFM:	97.9	46.21	L/s		#O ₂ /Day/1000 Ft ³ :	198	3.18	: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	10.94	13.35	10.86	0.05	11.94	9.43	9.35	0.9987
2	11.97	14.61	11.92	0.05	13.10	10.35	9.38	0.9988
3	11.82	14.43	11.82	0.05	12.99	10.27	9.42	0.9978
4	11.53	14.08	11.42	0.05	12.55	9.92	9.32	0.9964
avg.	11.56	14.12	11.51	0.05	12.64	9.99	9.37	0.9979
Avg	11.67	14.25	11.62	0.05	12.77	10.09	9.37	Exclude Max&Min
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

EUROPEAN STANDARD

Probe	K _{La} r	K _{La} 20	SOTR	SOTR/Dev	SAE	C*	
1	10.75	13.13	4.79	0.02	5.58	9.36	
2	12.21	14.91	5.42	0.02	6.31	9.34	
3	11.66	14.23	5.23	0.02	6.10	9.44	
4	11.46	13.99	5.07	0.02	5.90	9.30	
avg.	11.52	14.06	5.13	0.02	5.97	9.36	
Avg	11.56	14.11	5.14	0.02	6.00	9.35	Exclude Max&Min
	/hr	/hr	kg O ₂ /hr		kg O ₂ /hr-kw	mg/L	

OXYGEN TRANSFER AT TEST 19779 mg/L TDS CONCENTRATION

Average	K _{La} r	K _{La} 20	OTR	OTR/Dev	OTE	AE _{wire}	C*
	11.519	14.06	9.86	0.05	10.83	8.56	9.36
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw	