

ASCE OXYGEN TRANSFER DETERMINATION

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

DATE: 11-Jan-07

RUN: 11 - 35,000 mg/L NaCl

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	Initial	Mid Point	Final		
Barometric Pres. (PSIA)	14.447	14.445	14.439	C' Air Flow Device 1 (Annubar)	1,529.90
(mm Hg)	747.10	747.00	746.70	Air Flow Device 1 (SCFM)	90.42
Ambient Temperature (°F)	56.30	56.70	57.60	C' Air Flow Device 2 (Orifice)	251.10
Relative Humidity (%)	35%	35%	35%	Air Flow Device 2 (SCFM)	90.29
Line Pressure (PSIG)	2.505	2.480	2.456	TDS Water Density @ 20°C (kg/m³)	1,024.30
(In. Hg)	5.10	5.05	5.00	Standard Density @ 20°C (kg/m³)	998.23
Line Temperature (°F)	76.00	83.00	84.00	Temp. Correction Factor (τ)	1.32
ΔH Air Flow Dev. 1 (Annubar)	0.110	0.115	0.110	Pressure Correction Factor (Ω)	0.98
ΔH Air Flow Dev. 2 (Orifice)	4.200	4.100	4.100	Average Air Flow (SCFM)	90.36
C _{sm} T (Standard Methods, mg/l at 0 TDS))		11.966		Effective Depth Correction (f)	0.35
C* ₂₀ (mg/L at 0 TDS)		9.305	0.782	Headloss (In. H ₂ O)	15.00
Water Temp. (°C)	7.40	7.67	7.67	C* (mg/l)	9.41
Orifice Diameter (in)		1.840		C _{sm} T (Standard Methods, mg/l at test TDS))	9.36
Number Of Aeration Devices		217		C* ₂₀ (mg/L at Test TDS)	7.28
Side Water Depth (ft)		4.00	(1.22 m)	Tank Volume (Ft³)	1,385.4
Air Release Depth (ft)		2.23	(0.68 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)	0.089
Tank Diameter (ft)		21.00	(6.40 m)	#Na ₂ SO ₃ @ 840% Stoichiometric	55.34
Gear Reducer or Belt Efficiency		100.0%		Cobalt Concen. (mg/l)	0.100
Motor Efficiency		85.0%		Grams Cobalt Chloride	16.6
Blower HP _{wire}		1.19	(0.88 kw)	Blower HP _{motor}	1.01
Total HP _{wire} av.		1.19	(0.88 kw)	Total HP _{motor} av.	1.01
Actual Air Flow (ACFM)		80.30		TDS (mg/L)	34,360.00

NON-LINEAR REGRESSION RESULTS

Probe	K _{La}	K _{La20}	SOTR	SOTR/Dev	SOTE	SAE _{wire}	C*	Std. Err.
1	13.36	17.94	14.78	0.07	15.79	12.46	9.41	0.0975
2	13.31	17.87	14.75	0.07	15.76	12.44	9.43	0.0291
3	13.27	17.82	14.41	0.07	15.39	12.15	9.23	0.0399
4	13.28	17.83	14.87	0.07	15.88	12.53	9.52	0.0852
5	13.49	18.11	14.94	0.07	15.96	12.59	9.42	0.0392
6	13.09	17.58	14.58	0.07	15.58	12.29	9.47	0.0394
avg.	13.30	17.86	14.72	0.07	15.73	12.41	9.41	0.0550
Avg	13.31	17.87	14.76	0.07	15.76	12.44	9.43	Exclude Max&Min
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-WHP		

OXYGEN TRANSFER

Total SCFM:	90.4	145.270	:Nm ³ /Hr	42.644	L/s	#O ₂ /Hr:	14.69	6.664	:KgO ₂ /Hr
SCFM/Diff.:	0.42	0.669	:Nm ³ /hr/Diff			#O ₂ /Hr/Diff.:	0.07	0.031	:KgO ₂ /Hr/Diff.
SCFM/KCF:	65.2	3.703	:Nm ³ /hr/m ³			#O ₂ /Day:	352.6	159.9	:KgO ₂ /Day
Total ICFM:	94.0	44.38	L/s			#O ₂ /Day/1000 Ft ³ :	255	4.08	:KgO ₂ /Day/m ³

LINEAR REGRESSION RESULTS

Probe	K _{La}	K _{La20}	SOTR	SOTR/Dev	SOTE	SAE _{wire}	C*	Corr.Coeff.
1	13.15	17.65	14.58	0.07	15.58	12.29	9.44	0.9996
2	13.24	17.77	14.70	0.07	15.70	12.39	9.44	0.9996
3	13.25	17.79	14.41	0.07	15.39	12.15	9.25	0.9990
4	13.74	18.45	15.37	0.07	16.41	12.95	9.51	0.9969
5	13.16	17.67	14.61	0.07	15.61	12.32	9.44	0.9993
6	12.85	17.25	14.31	0.07	15.29	12.06	9.47	0.9990
avg.	13.23	17.76	14.66	0.07	15.66	12.36	9.43	0.9989
Avg	13.20	17.72	14.67	0.07	15.67	12.37	9.45	Exclude Max&Min
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

EUROPEAN STANDARD

Probe	K _{La}	K _{La20}	SOTR	SOTR/Dev	SAE	C*
1	13.25	17.79	6.66	0.03	7.53	9.41
2	13.27	17.82	6.69	0.03	7.56	9.43
3	13.26	17.81	6.54	0.03	7.40	9.23
4	13.51	18.14	6.87	0.03	7.77	9.52
5	13.32	17.89	6.71	0.03	7.58	9.42
6	12.97	17.41	6.56	0.03	7.42	9.47
avg.	13.27	17.81	6.67	0.03	7.54	9.41
Avg	13.28	17.83	6.69	0.03	7.52	9.43
	/hr	/hr	kg O ₂ /hr		kg O ₂ /hr-kw	mg/L

OXYGEN TRANSFER AT TEST 34360 mg/L TDS CONCENTRATION

Average	K _{La}	K _{La20}	OTR	OTR/Dev	OTE	AE _{wire}	C*
	13.266	17.81	11.21	0.05	11.97	9.45	9.41
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw	