

## ASCE OXYGEN TRANSFER DETERMINATION

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

**DATE:** 5-Jan-07

**RUN:** 6 - 25,000 mg/L NaCl

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	Initial	Mid Point	Final		
Barometric Pres. (PSIA)	14.166	14.166	14.158	C' Air Flow Device 1 (Annubar)	1,514.09
(mm Hg)	732.60	732.60	732.20	Air Flow Device 1 (SCFM)	87.88
Ambient Temperature (°F)	66.60	66.40	66.60	C' Air Flow Device 2 (Orifice)	248.51
Relative Humidity (%)	71%	70%	70%	Air Flow Device 2 (SCFM)	88.33
Line Pressure (PSIG)	2.456	2.480	2.456	TDS Water Density @ 20°C (kg/m³)	1,015.49
(In. Hg)	5.00	5.05	5.00	Standard Density @ 20°C (kg/m³)	998.23
Line Temperature (°F)	100.00	99.00	99.00	Temp. Correction Factor (τ)	1.19
ΔH Air Flow Dev. 1 (Annubar)	0.120	0.110	0.110	Pressure Correction Factor (Ω)	0.96
ΔH Air Flow Dev. 2 (Orifice)	4.300	4.200	4.250	Average Air Flow (SCFM)	88.11
C <sub>sm</sub> T (Standard Methods, mg/l at 0 TDS)		10.827	β (C <sup>*20TDS</sup> /C <sup>*20CW</sup> )	Effective Depth Correction (f)	0.34
C* <sub>20</sub> (mg/L at 0 TDS)		9.292	<b>0.855</b>	Headloss (In. H <sub>2</sub> O)	15.00
Water Temp. (°C)	11.70	11.83	11.86	C* (mg/l)	9.12
Orifice Diameter (in)		1.840		C <sub>sm</sub> T (Standard Methods, mg/l at test TDS))	9.25
Number Of Aeration Devices		217		C* <sub>20</sub> (mg/L at Test TDS)	7.94
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 <sub>2</sub> SO <sub>3</sub> @ 425% Stoichiometric	26.89
Gear Reducer or Belt Efficiency		100.0%		Cobalt Concn. (mg/l)	0.100
Motor Efficiency		85.0%		Grams Cobalt Chloride	16.4
Blower HP <sub>wire</sub>		1.15	(0.86 kw)	Blower HP <sub>motor</sub>	0.98
Total HP <sub>wire</sub> av.		1.15	(0.86 kw)	Total HP <sub>motor</sub> av.	0.98
Actual Air Flow (ACFM)		83.00		TDS (mg/L)	22,770.00

### NON-LINEAR REGRESSION RESULTS

Probe	K <sub>La</sub> r	K <sub>La</sub> 20	SOTR	SOTR/Dev	SOTE	SAE <sub>wire</sub>	C*	Std. Err.
1	12.20	14.82	12.10	0.06	13.25	10.48	9.12	0.0467
2	11.99	14.57	11.94	0.06	13.08	10.34	9.16	0.1049
3	12.24	14.87	12.12	0.06	13.27	10.49	9.10	0.0593
4	12.41	15.08	12.28	0.06	13.45	10.63	9.09	0.0560
avg.	12.21	14.83	12.11	0.06	13.26	10.49	9.12	0.0667
Avg	12.22	14.85	12.11	0.06	13.26	10.49	9.11	Exclude Max&Min
	/hr	/hr	#O <sub>2</sub> /hr		%	#O <sub>2</sub> /hr-WHP		

OXYGEN TRANSFER									
Total SCFM:	88.1	141.652	:Nm <sup>3</sup> /Hr	41.582	L/s	#O <sub>2</sub> /Hr:	12.16	5.514	:KgO <sub>2</sub> /Hr
SCFM/Diff.:	0.41	0.653	:Nm <sup>3</sup> /hr/Diff			#O <sub>2</sub> /Hr/Diff.:	0.06	0.025	:KgO <sub>2</sub> /Hr/Diff.
SCFM/KCF:	63.6	3.611	:Nm <sup>3</sup> /hr/m <sup>3</sup>			#O <sub>2</sub> /Day:	291.7	132.3	:KgO <sub>2</sub> /Day
Total ICFM:	97.4	45.96	L/s		#O <sub>2</sub> /Day/1000 Ft <sup>3</sup> :	211	3.37	:KgO <sub>2</sub> /Day/m <sup>3</sup>	

### LINEAR REGRESSION RESULTS

Probe	K <sub>La</sub> r	K <sub>La</sub> 20	SOTR	SOTR/Dev	SOTE	SAE <sub>wire</sub>	C*	Corr.Coeff.
1	12.32	14.96	12.18	0.06	13.35	10.55	9.10	0.9986
2	12.07	14.66	12.00	0.06	13.14	10.39	9.14	0.9918
3	12.65	15.37	12.45	0.06	13.64	10.78	9.05	0.9976
4	12.32	14.97	12.19	0.06	13.35	10.56	9.10	0.9966
avg.	12.34	14.99	12.21	0.06	13.37	10.57	9.10	0.9962
Avg	12.32	14.97	12.20	0.06	13.36	10.56	9.10	Exclude Max&Min
	/hr	/hr	#O <sub>2</sub> /hr		%	#O <sub>2</sub> /hr-HPw		

### EUROPEAN STANDARD

Probe	K <sub>La</sub> r	K <sub>La</sub> 20	SOTR	SOTR/Dev	SAE	C*
1	12.26	14.89	5.43	0.03	6.30	9.12
2	12.03	14.61	5.35	0.02	6.21	9.16
3	12.44	15.12	5.50	0.03	6.39	9.10
4	12.37	15.03	5.46	0.03	6.35	9.09
avg.	12.28	14.91	5.44	0.03	6.31	9.12
Avg	12.31	14.96	5.45	0.03	6.32	9.11
	/hr	/hr	kg O <sub>2</sub> /hr		kg O <sub>2</sub> /hr-kw	mg/L

### OXYGEN TRANSFER AT TEST 22770 mg/L TDS CONCENTRATION

Average	K <sub>La</sub> r	K <sub>La</sub> 20	OTR	OTR/Dev	OTE	AE <sub>wire</sub>	C*
	12.276	14.91	10.24	0.05	11.22	8.87	9.12
	/hr	/hr	#O <sub>2</sub> /hr		%	#O <sub>2</sub> /hr-HPw	