

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: **Aerations Solutions Inc.**

DATE: **12-Sep-01**

RUN: **1 - Used Diffuser**

599 Waldron Rd.
LaVergne, TN 37086
615/793-7547
FAX 615/793/5070

	Initial	Mid Point	Final		
Barometric Pres. (PSIA)	14.439	14.439	14.437		
(mm Hg)	746.50	746.50	746.40	Air Flow Device 1 (SCFM)	3.76
Ambient Temperature (°F)	83.30	84.20	86.00	Air Flow/Device (SCFM)	3.76
Relative Humidity (%)	64%	64%	63%		
Line Pressure (PSIG)	2.210	2.210	2.210		
(In. Hg)	4.50	4.50	4.50	Average Air Flow (SCFM)	3.76
Line Temperature (°F)	98.00	99.00	100.00	Effective Depth Correction (f)	0.35
Flowmeter Reading (ACFM)	4.00	4.00	4.00	Headloss (In. H ₂ O)	13.19
Water Temp. (°C)	25.20	25.20	25.20	C* (mg/l)	8.43
Orifice Diameter (in)		NA		C _{smT} (Standard Methods, mg/l)	8.23
Number Of Aeration Devices		1		C* ₂₀ Standard Conditions	9.47
Side Water Depth (ft)		5.00	(1.52 m)	Tank Volume (Ft ³)	65.7
Air Release Depth (ft)		4.00	(1.22 m)	(Gallons)	491.5
Tank Length (ft)		6.57	(2.00 m)	(m ³)	1.9
Tank Width (ft)		2.00	(0.61 m)	(Million Pounds)	0.004
Tank Diameter (ft)		0.00	(0.00 m)	g NaSO ₃ @ 150% Stoichiometric	185.94
Gear Reducer or Belt Efficiency		100.0%		Cobalt Concen. (mg/l)	0.100
Motor Efficiency		100.0%		Grams Cobalt Chloride	0.8
Hpmotor		0.05		Turbine HP or Motor HP _{wire}	0.00
Total HP _{wire} av.		0.05	#N/A	Total HP _{motor} av.	0.00

NON-LINEAR REGRESSION RESULTS

Probe	K _L a _T	K _L a ₂₀	SOTR	SOTR/dev	SOTE	SAE _{wire}	C*	Std. Err.
1	8.39	7.42	0.29	0.29	7.40	5.67	8.43	0.0496
2	8.24	7.28	0.28	0.28	7.28	5.57	8.44	0.1142
avg.	8.32	7.35	0.29	0.29	7.34	5.62	8.43	0.0819
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

AIR FLOW RATE

Total SCFM:	3.8	6.038	:Nm ³ /Hr
SCFM/Diff.:	3.76	6.038	:Nm ³ /hr/Diff
SCFM/1000 Ft ³ :	57.2	3.245	:Nm ³ /hr/m ³
Total ICFM:	3.3	1.84%	per Ft. DWD

OXYGEN TRANSFER

#O ₂ /Hr:	0.29	0.130	:KgO ₂ /Hr
#O ₂ /Hr/Diff.:	0.29	0.130	:KgO ₂ /Hr/Diff.
#O ₂ /Day:	6.9	3.1	:KgO ₂ /Day
#O ₂ /Day/1000 Ft ³ :	104	1.67	:KgO ₂ /Day/m ³

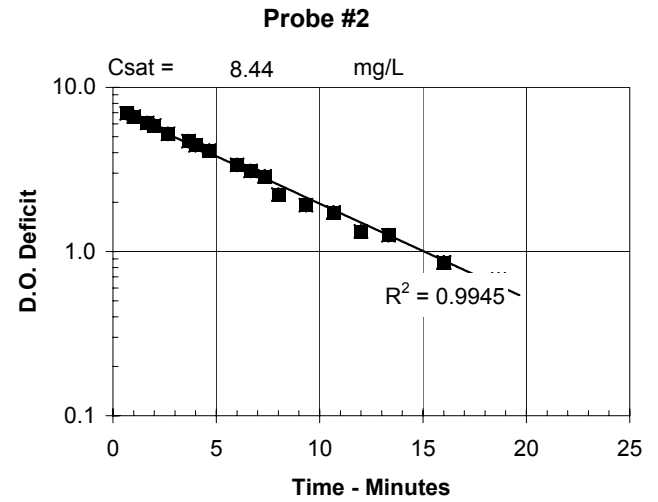
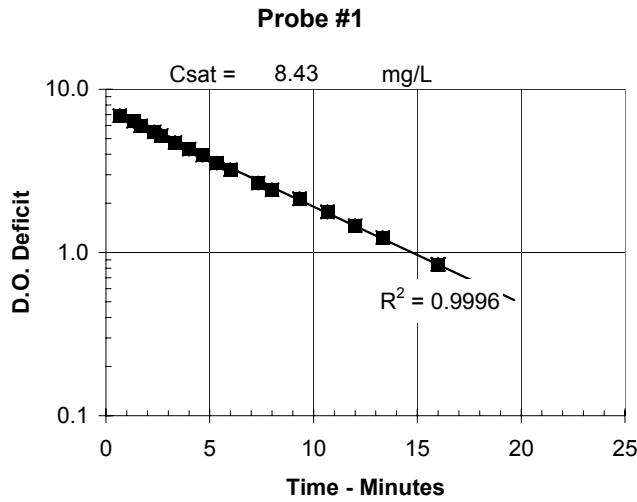
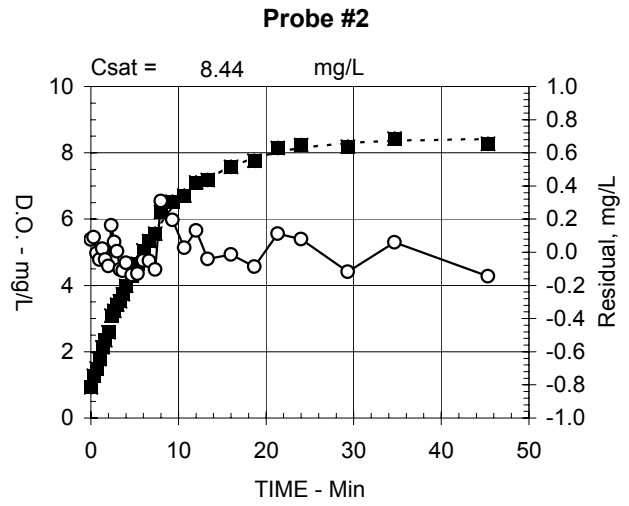
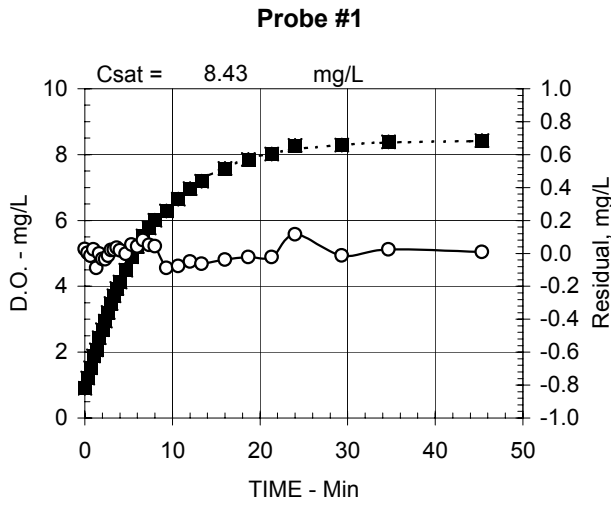
LINEAR REGRESSION RESULTS

Probe	K _L a _T	K _L a ₂₀	SOTR	SOTR/dev	SOTE	SAE _{wire}	C*	Corr.Coeff.
1	8.19	7.24	0.28	0.28	7.22	5.53	8.43	0.9996
2	7.98	7.05	0.27	0.27	7.05	5.40	8.44	0.9945
avg.	8.08	7.15	0.28	0.28	7.14	5.46	8.43	0.9970
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

Pt. 1				Pt. 2			
	est.	calc.		est.	calc.		
C0	0.88	0.88		C0	0.85	0.85	
Kla-in	8.39	8.39		Kla-in	8.24	8.24	
C*	8.43	8.43		C*	8.44	8.44	
Sq.Diff.	0.0665			Sq.Diff.	0.3523		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	0.9	0.9	0.0	0.00	0.9	0.8	0.1
0.33	1.2	1.2	0.0	0.33	1.3	1.2	0.1
0.66	1.5	1.5	0.0	0.66	1.5	1.5	0.0
1.00	1.9	1.9	0.0	1.00	1.8	1.8	0.0
1.33	2.1	2.2	-0.1	1.33	2.1	2.1	0.0
1.66	2.4	2.4	0.0	1.66	2.3	2.4	0.0
2.00	2.7	2.7	0.0	2.00	2.6	2.7	-0.1
2.33	2.9	3.0	0.0	2.33	3.1	2.9	0.2
2.66	3.2	3.2	0.0	2.66	3.2	3.2	0.1
3.00	3.5	3.5	0.0	3.00	3.4	3.4	0.0
3.33	3.7	3.7	0.0	3.33	3.5	3.6	-0.1
3.66	3.9	3.9	0.0	3.66	3.7	3.8	-0.1
4.00	4.1	4.1	0.0	4.00	4.0	4.1	-0.1
4.66	4.5	4.5	0.0	4.66	4.3	4.4	-0.1
5.33	4.9	4.8	0.1	5.33	4.7	4.8	-0.1
6.00	5.2	5.2	0.0	6.00	5.1	5.1	-0.1
6.66	5.5	5.5	0.1	6.66	5.3	5.4	-0.1
7.33	5.8	5.7	0.1	7.33	5.6	5.7	-0.1
8.00	6.0	6.0	0.0	8.00	6.2	5.9	0.3
9.33	6.3	6.4	-0.1	9.33	6.5	6.3	0.2
10.66	6.6	6.7	-0.1	10.66	6.7	6.7	0.0
12.00	7.0	7.0	0.0	12.00	7.1	7.0	0.1
13.33	7.2	7.3	-0.1	13.33	7.2	7.2	0.0
16.00	7.6	7.6	0.0	16.00	7.6	7.6	0.0
18.66	7.8	7.9	0.0	18.66	7.8	7.9	-0.1
21.33	8.0	8.0	0.0	21.33	8.1	8.0	0.1
24.00	8.3	8.2	0.1	24.00	8.2	8.2	0.1
29.33	8.3	8.3	0.0	29.33	8.2	8.3	-0.1
34.66	8.4	8.4	0.0	34.66	8.4	8.4	0.1
45.33	8.4	8.4	0.0	45.33	8.3	8.4	-0.1

Probe 1				Probe 2			
Lower	10.70%	Upper	99.95%	Lower	10.94%	Upper	99.93%
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE
C*	8.426	0.024	0.290	C*	8.435	0.057	0.675
C0	0.876	0.024	2.750	C0	0.845	0.055	6.526
KLaT	8.391	0.001	1.021	KLaT	8.240	0.003	2.351
Error	0.050			Error	0.114		

PROJECT: Aerations Solutions Inc.
DATE: #####



Project: Aerations Solutions Inc.
 Date: Sep 12, 2001
 Run: 1 - Used Diffuser

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: **Aerations Solutions Inc.**

DATE: **12-Sep-01**

RUN: **2 - Used Diffuser**

599 Waldron Rd.
LaVergne, TN 37086
615/793-7547
FAX 615/793/5070

	Initial	Mid Point	Final		
Barometric Pres. (PSIA)	14.431	14.431	14.429		
(mm Hg)	746.10	746.10	746.00	Air Flow Device 1 (SCFM)	1.85
Ambient Temperature (°F)	87.80	87.80	89.60	Air Flow/Device (SCFM)	1.85
Relative Humidity (%)	62%	61%	60%		
Line Pressure (PSIG)	2.112	2.112	2.112		
(In. Hg)	4.30	4.30	4.30	Average Air Flow (SCFM)	1.85
Line Temperature (°F)	99.00	99.00	99.00	Effective Depth Correction (f)	0.35
Flowmeter Reading (ACFM)	2.00	2.00	2.00	Headloss (In. H ₂ O)	10.47
Water Temp. (°C)	25.30	25.30	25.30	C* (mg/l)	8.41
Orifice Diameter (in)		NA		C _{smT} (Standard Methods, mg/l)	8.22
Number Of Aeration Devices		1		C* ₂₀ Standard Conditions	9.47
Side Water Depth (ft)		5.00	(1.52 m)	Tank Volume (Ft ³)	65.7
Air Release Depth (ft)		4.00	(1.22 m)	(Gallons)	491.5
Tank Length (ft)		6.57	(2.00 m)	(m ³)	1.9
Tank Width (ft)		2.00	(0.61 m)	(Million Pounds)	0.004
Tank Diameter (ft)		0.00	(0.00 m)	g NaSO ₃ @ 150% Stoichiometric	185.51
Gear Reducer or Belt Efficiency		100.0%		Cobalt Concen. (mg/l)	0.100
Motor Efficiency		100.0%		Grams Cobalt Chloride	0.8
Hpmotor		0.02		Turbine HP or Motor HP _{wire}	0.00
Total HP _{wire} av.		0.02	#N/A	Total HP _{motor} av.	0.00

NON-LINEAR REGRESSION RESULTS

Probe	K _L a _T	K _L a ₂₀	SOTR	SOTR/dev	SOTE	SAE _{wire}	C*	Std. Err.
1	3.90	3.44	0.13	0.13	6.97	5.57	8.42	0.0240
2	3.83	3.38	0.13	0.13	6.84	5.46	8.41	0.0712
avg.	3.87	3.41	0.13	0.13	6.90	5.52	8.41	0.0476
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

AIR FLOW RATE

Total SCFM:	1.9	2.979	:Nm ³ /Hr
SCFM/Diff.:	1.85	2.979	:Nm ³ /hr/Diff
SCFM/1000 Ft ³ :	28.2	1.601	:Nm ³ /hr/m ³
Total ICFM:	1.6	1.73%	per Ft. DWD

OXYGEN TRANSFER

#O ₂ /Hr:	0.13	0.060	:KgO ₂ /Hr
#O ₂ /Hr/Diff.:	0.13	0.060	:KgO ₂ /Hr/Diff.
#O ₂ /Day:	3.2	1.4	:KgO ₂ /Day
#O ₂ /Day/1000 Ft ³ :	48	0.78	:KgO ₂ /Day/m ³

LINEAR REGRESSION RESULTS

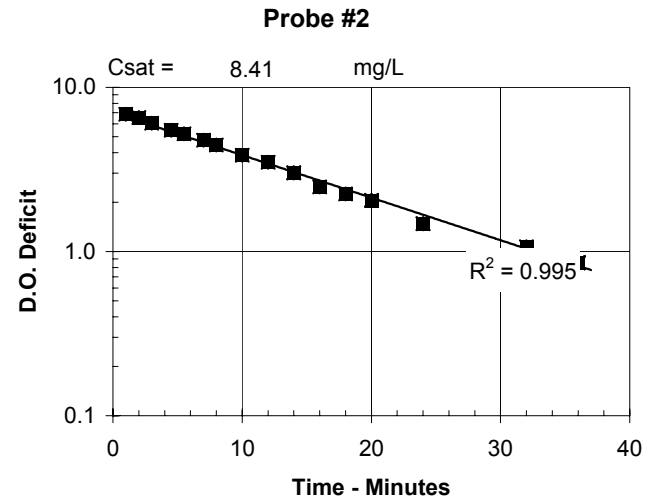
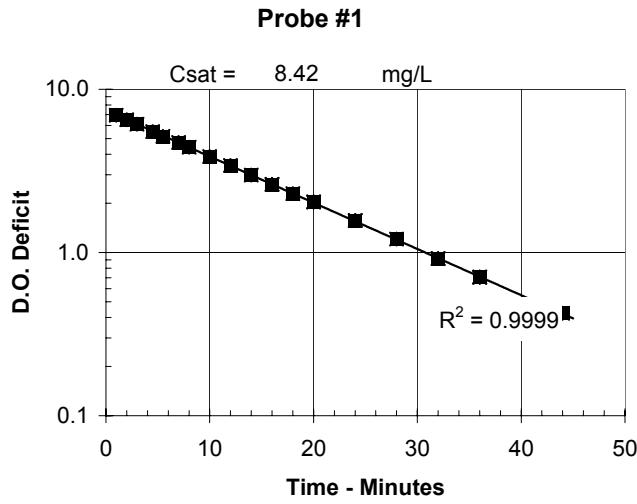
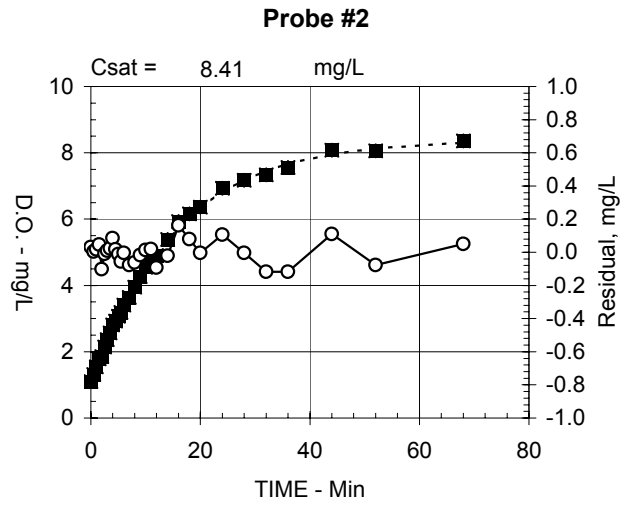
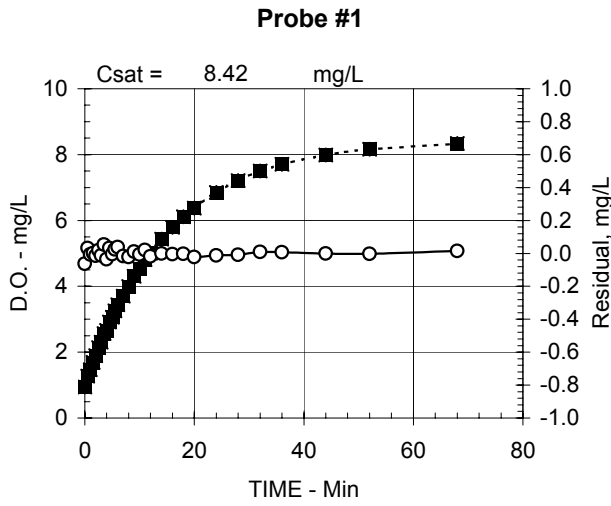
Probe	K _L a _T	K _L a ₂₀	SOTR	SOTR/dev	SOTE	SAE _{wire}	C*	Corr.Coeff.
1	3.91	3.45	0.13	0.13	6.99	5.59	8.42	0.9999
2	3.58	3.16	0.12	0.12	6.39	5.10	8.41	0.9950
avg.	3.75	3.30	0.13	0.13	6.69	5.34	8.41	0.9975
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

Pt. 1			Pt. 2		
	est.	calc.		est.	calc.
C0	1.00	1.00	C0	1.07	1.07
Kla-in	3.90	3.90	Kla-in	3.83	3.83
C*	8.42	8.42	C*	8.41	8.41
Sq.Diff.	0.0156		Sq.Diff.	0.1370	

Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	0.9	1.0	-0.1	0.00	1.1	1.1	0.0
0.50	1.3	1.2	0.0	0.50	1.3	1.3	0.0
1.00	1.5	1.5	0.0	1.00	1.5	1.5	0.0
1.50	1.7	1.7	0.0	1.50	1.8	1.7	0.0
2.00	1.9	1.9	0.0	2.00	1.8	2.0	-0.1
2.50	2.1	2.1	0.0	2.50	2.1	2.2	0.0
3.00	2.3	2.3	0.0	3.00	2.4	2.4	0.0
3.50	2.6	2.5	0.1	3.50	2.6	2.5	0.0
4.00	2.7	2.7	0.0	4.00	2.8	2.7	0.1
4.50	2.9	2.9	0.0	4.50	2.9	2.9	0.0
5.00	3.1	3.1	0.0	5.00	3.1	3.1	0.0
5.50	3.3	3.2	0.0	5.50	3.2	3.2	-0.1
6.00	3.4	3.4	0.0	6.00	3.4	3.4	0.0
7.00	3.7	3.7	0.0	7.00	3.6	3.7	-0.1
8.00	4.0	4.0	0.0	8.00	3.9	4.0	-0.1
9.00	4.3	4.3	0.0	9.00	4.3	4.3	0.0
10.00	4.5	4.5	0.0	10.00	4.5	4.5	0.0
11.00	4.8	4.8	0.0	11.00	4.8	4.8	0.0
12.00	5.0	5.0	0.0	12.00	4.9	5.0	-0.1
14.00	5.4	5.4	0.0	14.00	5.4	5.4	0.0
16.00	5.8	5.8	0.0	16.00	5.9	5.8	0.2
18.00	6.1	6.1	0.0	18.00	6.2	6.1	0.1
20.00	6.4	6.4	0.0	20.00	6.4	6.4	0.0
24.00	6.8	6.9	0.0	24.00	6.9	6.8	0.1
28.00	7.2	7.2	0.0	28.00	7.2	7.2	0.0
32.00	7.5	7.5	0.0	32.00	7.3	7.5	-0.1
36.00	7.7	7.7	0.0	36.00	7.6	7.7	-0.1
44.00	8.0	8.0	0.0	44.00	8.1	8.0	0.1
52.00	8.2	8.2	0.0	52.00	8.1	8.1	-0.1
68.00	8.3	8.3	0.0	68.00	8.4	8.3	0.0

Probe 1				Probe 2			
Lower	11.20%	Upper	99.13%	Lower	13.13%	Upper	99.46%
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE
C*	8.416	0.016	0.188	C*	8.406	0.048	0.570
C0	1.005	0.011	1.048	C0	1.073	0.031	2.897
KLaT	3.904	0.000	0.583	KLaT	3.832	0.001	1.766
Error	0.024			Error	0.071		

PROJECT: Aerations Solutions Inc.
DATE: #####



Project: Aerations Solutions Inc.
 Date: Sep 12, 2001
 Run: 2 - Used Diffuser

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: **Aerations Solutions Inc.**

DATE: **12-Sep-01**

RUN: **3 - Used Diffuser**

599 Waldron Rd.
LaVergne, TN 37086
615/793-7547
FAX 615/793/5070

	Initial	Mid Point	Final		
Barometric Pres. (PSIA)	14.421	14.421	14.420		
(mm Hg)	745.60	745.60	745.50	Air Flow Device 1 (SCFM)	7.42
Ambient Temperature (°F)	91.40	91.40	91.40	Air Flow/Device (SCFM)	7.42
Relative Humidity (%)	58%	58%	58%		
Line Pressure (PSIG)	2.456	2.456	2.456		
(In. Hg)	5.00	5.00	5.00	Average Air Flow (SCFM)	7.42
Line Temperature (°F)	102.00	104.00	108.00	Effective Depth Correction (f)	0.39
Flowmeter Reading (ACFM)	8.00	7.98	7.95	Headloss (In. H ₂ O)	19.99
Water Temp. (°C)	25.40	25.50	25.50	C* (mg/l)	8.41
Orifice Diameter (in)		NA		C _{smT} (Standard Methods, mg/l)	8.19
Number Of Aeration Devices		1		C* ₂₀ Standard Conditions	9.50
Side Water Depth (ft)		5.00	(1.52 m)	Tank Volume (Ft ³)	65.7
Air Release Depth (ft)		4.00	(1.22 m)	(Gallons)	491.5
Tank Length (ft)		6.57	(2.00 m)	(m ³)	1.9
Tank Width (ft)		2.00	(0.61 m)	(Million Pounds)	0.004
Tank Diameter (ft)		0.00	(0.00 m)	g NaSO ₃ @ 150% Stoichiometric	185.51
Gear Reducer or Belt Efficiency		100.0%		Cobalt Concen. (mg/l)	0.100
Motor Efficiency		100.0%		Grams Cobalt Chloride	0.8
Hpmotor		0.11		Turbine HP or Motor HP _{wire}	0.00
Total HP _{wire} av.		0.11	#N/A	Total HP _{motor} av.	0.00

NON-LINEAR REGRESSION RESULTS

Probe	K _{LaT}	K _{La20}	SOTR	SOTR/dev	SOTE	SAE _{wire}	C*	Std. Err.
1	16.22	14.25	0.55	0.55	7.19	4.97	8.37	0.0724
2	15.35	13.48	0.53	0.53	6.87	4.75	8.45	0.1004
avg.	15.78	13.86	0.54	0.54	7.03	4.86	8.41	0.0864
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

AIR FLOW RATE

Total SCFM:	7.4	11.936	:Nm ³ /Hr
SCFM/Diff.:	7.42	11.936	:Nm ³ /hr/Diff
SCFM/1000 Ft ³ :	113.0	6.416	:Nm ³ /hr/m ³
Total ICFM:	6.6	1.76%	per Ft. DWD

OXYGEN TRANSFER

#O ₂ /Hr:	0.54	0.245	:KgO ₂ /Hr
#O ₂ /Hr/Diff.:	0.54	0.245	:KgO ₂ /Hr/Diff.
#O ₂ /Day:	13.0	5.9	:KgO ₂ /Day
#O ₂ /Day/1000 Ft ³ :	197	3.16	:KgO ₂ /Day/m ³

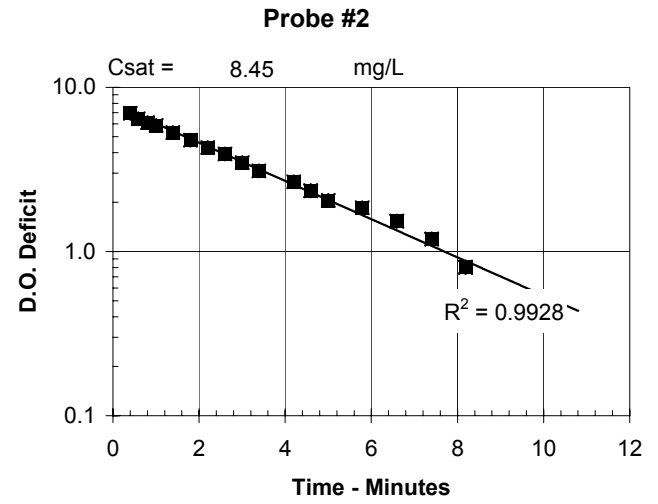
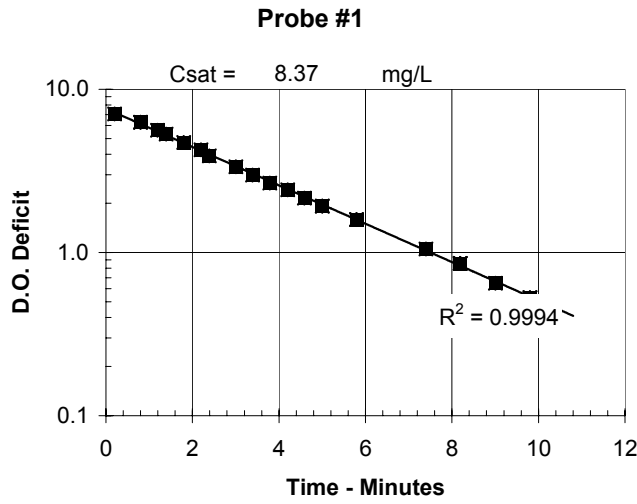
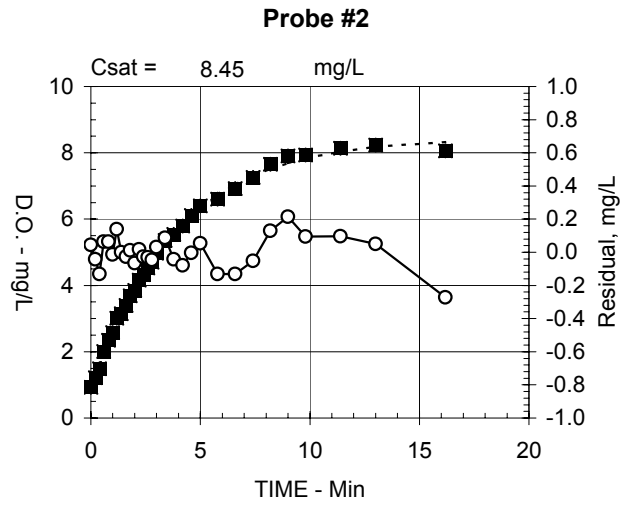
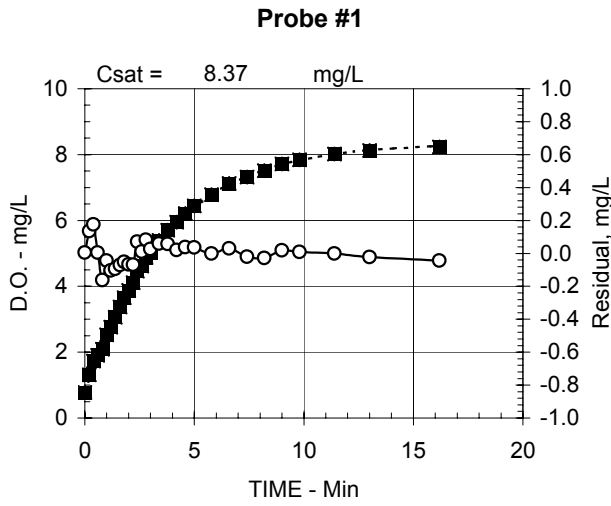
LINEAR REGRESSION RESULTS

Probe	K _{LaT}	K _{La20}	SOTR	SOTR/dev	SOTE	SAE _{wire}	C*	Corr.Coeff.
1	16.24	14.27	0.55	0.55	7.20	4.98	8.37	0.9994
2	16.07	14.12	0.55	0.55	7.19	4.98	8.45	0.9928
avg.	16.16	14.19	0.55	0.55	7.20	4.98	8.41	0.9961
	/hr	/hr	#O ₂ /hr		%	#O ₂ /hr-HPw		

Pt. 1				Pt. 2			
	est.	calc.		est.	calc.		
C0	0.78	0.78		C0	0.89	0.89	
Kla-in	16.22	16.22		Kla-in	15.35	15.35	
C*	8.37	8.37		C*	8.45	8.45	
Sq.Diff.	0.1417			Sq.Diff.	0.2720		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	0.8	0.8	0.0	0.00	0.9	0.9	0.0
0.20	1.3	1.2	0.1	0.20	1.2	1.3	0.0
0.40	1.7	1.6	0.2	0.40	1.5	1.6	-0.1
0.59	1.9	1.9	0.0	0.59	2.0	1.9	0.1
0.80	2.1	2.3	-0.2	0.80	2.4	2.3	0.1
1.00	2.5	2.6	0.0	1.00	2.6	2.6	0.0
1.19	2.8	2.9	-0.1	1.19	3.0	2.9	0.1
1.39	3.1	3.2	-0.1	1.39	3.2	3.1	0.0
1.60	3.4	3.4	-0.1	1.60	3.4	3.4	0.0
1.80	3.7	3.7	-0.1	1.80	3.7	3.7	0.0
2.00	3.9	3.9	-0.1	2.00	3.9	3.9	-0.1
2.20	4.1	4.2	-0.1	2.20	4.2	4.1	0.0
2.39	4.5	4.4	0.1	2.39	4.3	4.3	0.0
2.60	4.6	4.6	0.0	2.60	4.5	4.6	0.0
2.79	4.9	4.8	0.1	2.79	4.7	4.7	0.0
3.00	5.0	5.0	0.0	3.00	5.0	4.9	0.0
3.39	5.4	5.3	0.1	3.39	5.4	5.3	0.1
3.79	5.7	5.6	0.1	3.79	5.5	5.6	0.0
4.20	6.0	5.9	0.0	4.20	5.8	5.9	-0.1
4.59	6.2	6.2	0.0	4.59	6.1	6.1	0.0
5.00	6.4	6.4	0.0	5.00	6.4	6.3	0.1
5.79	6.8	6.8	0.0	5.79	6.6	6.7	-0.1
6.59	7.1	7.1	0.0	6.59	6.9	7.1	-0.1
7.40	7.3	7.3	0.0	7.40	7.3	7.3	-0.1
8.19	7.5	7.5	0.0	8.19	7.7	7.5	0.1
9.00	7.7	7.7	0.0	9.00	7.9	7.7	0.2
9.80	7.8	7.8	0.0	9.80	7.9	7.8	0.1
11.40	8.0	8.0	0.0	11.40	8.1	8.0	0.1
13.00	8.1	8.1	0.0	13.00	8.2	8.2	0.0
16.19	8.2	8.3	0.0	16.19	8.1	8.3	-0.3

Probe 1				Probe 2			
Lower	9.32%	Upper	98.34%	Lower	11.00%	Upper	97.36%
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE
C*	8.369	0.044	0.520	C*	8.453	0.064	0.756
C0	0.776	0.038	4.856	C0	0.885	0.051	5.811
KLaT	16.217	0.005	1.665	KLaT	15.348	0.006	2.388
Error	0.072			Error	0.100		

PROJECT: Aerations Solutions Inc.
DATE: #####



Project: Aerations Solutions Inc.
 Date: Sep 12, 2001
 Run: 3 - Used Diffuser
