EVALUATION OF

OXYGEN TRANSFER CAPABILITIES:

PULSED HYDRAULICS INC MIXING SYSTEM

BY

GSEE, INC.
LAVERGNE, TN.
DECEMBER, 2006

GSEE
ENVIRONMENTAL CONSULTANTS

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1. INTRODUCTION

During the week of November 6, 2006, Pulsed Hydraulics Inc. (PHi) retained GSEE, Inc., to perform unsteady state clean water oxygen transfer tests on the Pulsed Hydraulics Inc. (PHi) Mixing System. Tests were performed at a liquid depth of 20' in the GSEE 21'Ø test basin. The purpose of the testing was to determine the amount of oxygen transferred by the Pulsed Hydraulics Inc. (PHi) Mixing System and to determine the effect of the Pulsed Hydraulics Inc. (PHi) Mixing System on a typical aeration system.

The PHi Mixing System testing was performed November 7-9, 2006. A single PHi Mixing System Forming Plate was installed and tested. Additionally, 28 fine bubble membrane tube diffusers were installed and tested both with and without the PHi Mixing system in operation. The following were present during all of the testing:

Dick Koopmans	Pulsed Hydraulics Inc. (PHi)
Chuck Neir	Pulsed Hydraulics Inc. (PHi)
Michael Hicks	GSEE, Inc.

Oxygen transfer is determined using the ASCE clean water non-steady state test procedures. The ASCE standard requires a regression analysis on the data from *each* sample location and then averages the obtained results.

Test results are reported at standard conditions of 20°C liquid temperature, one (1) atmosphere barometric pressure, zero (0) dissolved oxygen, and alpha (α) and beta (β) equal to 1.0 (clean tap water). All test results have also been calculated using both the ASCE linear and non-linear regression analysis methods for the determination of the mass transfer coefficient K_La_T, the steady-state D.O. saturation value C^*_∞, and the D.O. concentration at time zero C_o.

2. DESCRIPTION OF THE AERATION TEST BASIN

All testing occurred in the 21' diameter x 31' tall GSEE, Inc. test basins located in LaVergne, TN. The GSEE 21'Ø test basin is shown in Figure 2-1.

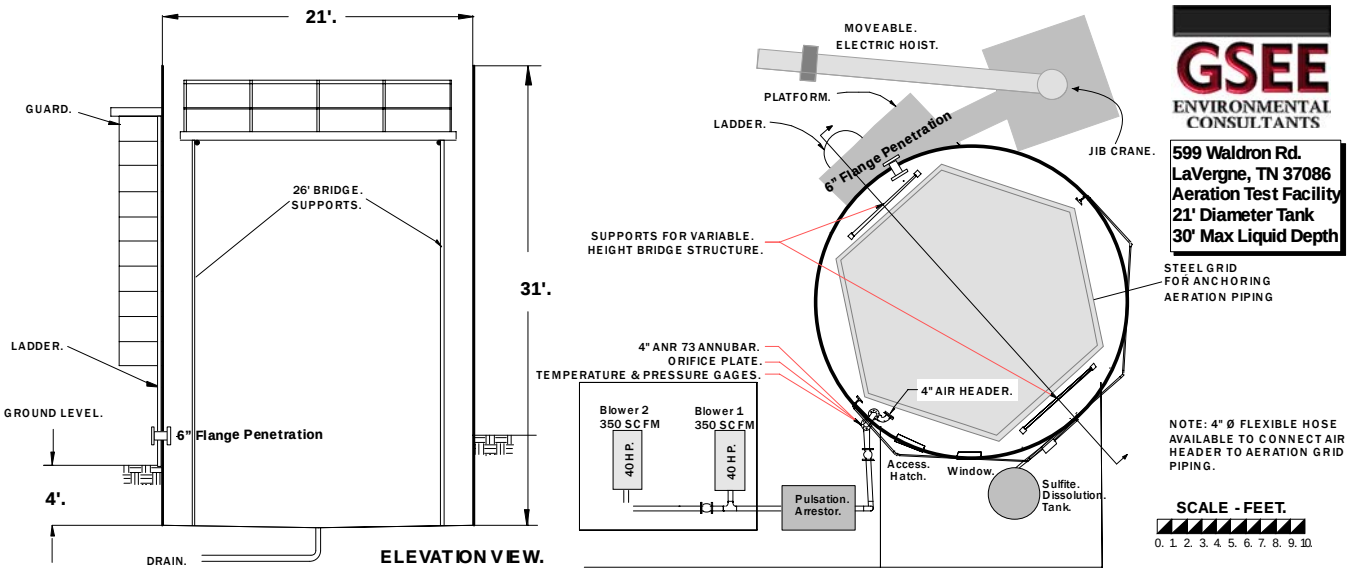
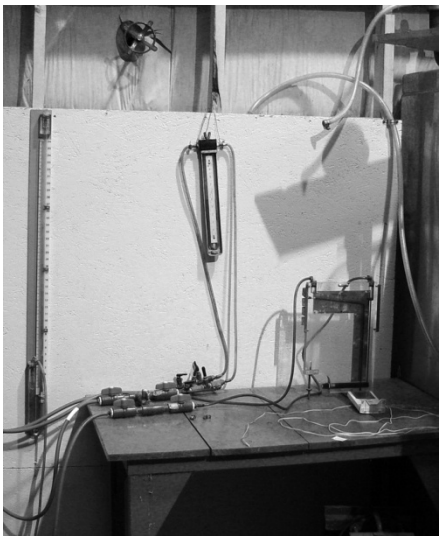


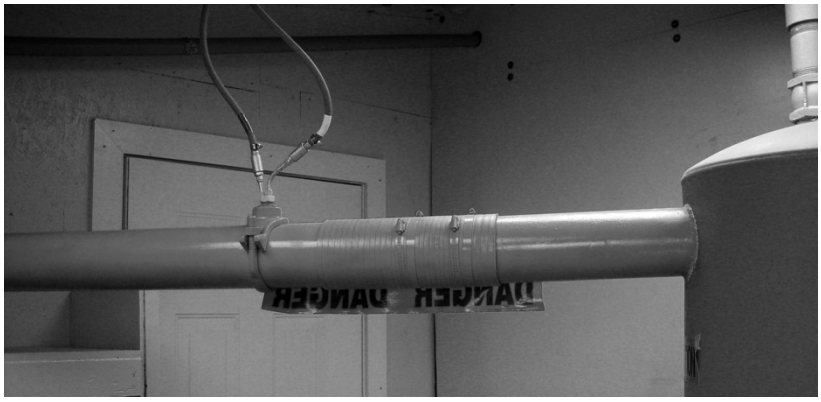
Figure 2-1 GSEE Test Facility

Air was supplied to the Pulsed Hydraulics Inc. (PHi) Mixing System via a Kaeser 5HP compressor.

The air sources for the fine bubble membrane tube diffusers are two positive displacement blowers, driven by 40HP and 50HP motors, respectively. The blowers used for the testing have a maximum operating pressure of 14 PSIG. A bypass valve is used to obtain airflow rates from 0 to 700 SCFM. Exact measurement of the airflow supplied to the test basin is determined using both a 4" ANR-73 Annubar air flow meter and a 1.349"Ø orifice plate installed in the header pipe. Measurement of airflow across the Annubar is monitored using a DWYER oil-filled combination vertical/inclined manometer. Measurement of airflow across the orifice plate is monitored using a water-filled vertical manometer. A mercury manometer is used to monitor the flowing air line pressure. A temperature probe monitors line temperature during each test. A mercury barometer is used to monitor local atmospheric pressure.

The following photographs show the blowers and airflow monitoring equipment:





2.1. Air Flow Calculations

Airflow rate is defined as follows:

SCFM = Standard Cubic Feet per Minute (14.7 PSIA, 68ºF, 36% RH and a density of 0.075 Lb/Ft^3)

ACFM or Actual Cubic Feet per Minute refers to air flowing *at any condition other than standard*. ACFM can be calculated as follows:

$$\text{ACFM} = \left[\frac{BP_S - (Rh_s \times Pv_s)}{BP - (Rh_a \times Pv_a)}\right] \times \frac{BP}{(BP + LP)} \times \frac{(460 + LT)}{528} \times SCFM \qquad \textbf{Eq. 2-1}$$

Where:

BP_S = Standard Barometric Pressure, 14.7 PSIA
Rh = Relative Humidity, % (s = Standard 36%, a = actual operating conditions)
Pva = Vapor Pressure of Water, psi (s = standard 0.3391, a = at actual temperature)
BP = Site Barometric Pressure, PSIA
LP = Flowing Line Pressure, PSIG
LT = Flowing Line Temperature, °F
528 = Standard Temperature (460 + 68°F), °R

ICFM is a *special form of ACFM referring to the air flow rate at the blower inlet*. ICFM is calculated as follows:

$$\textbf{ICFM} = SCFM \times \left[\frac{BP_S - (Rh_s \times Pv_s)}{BP - (Rh_a \times Pv_a)}\right] \times \frac{(460 + Ta)}{528} \qquad \textbf{Eq. 2-2}$$

Where:

Ta = Site Temperature, °F

The observed airflow rate may be converted to SI units as follows:

$$\text{Nm}^3/hr = SCFM \times 0.62067 \qquad \textbf{Eq. 2-3}$$

Where:

Nm^3/hr = Normal Cubic Meters Per hour (1 Atm., 0°C, 0% Rh)

The exact airflow rate for each test run is calculated using the following equation[1]:

$$\text{SCFM} = C'' \sqrt{\frac{(\text{BP} + \text{LP})}{(460 + \text{LT})} \Delta h} \qquad \textbf{Eq. 2-1}$$

Where:

C'' = Annubar Coefficient, corrected for site relative humidity
LT = Line Temperature, °F
LP = Line Pressure, PSIG
BP = Site Barometric Pressure, PSIA
Δh = Differential across air flow meter, inches of H_2O
SCFM = Standard Cubic Feet per Minute (14.696 PSIA, 68°F, 36% RH and a density of 0.075 Lb/Ft³)

The air flow device coefficient C'' is a C' value that produces the humidity corrected SCFM as described in Eq. A-1, page 14, Annex A of the ASCE Standard "Measurement of Oxygen Transfer in Clean Water".

Once C' is determined, the air flow rate in SCFM is calculated by the following:

[1] Spink, L.K.
"Principles and Practice of FLOW METER ENGINEERING" Ninth Edition, 1975
The FOXBORO COMPANY, Foxboro, Mass.

$$\text{SCFM} = C' \sqrt{\frac{(\text{BP}+\text{LP})}{(460+\text{LT})}\Delta h}$$ **Eq.** 2-2

Where:
C' = Annubar Coefficient

This value of SCFM is not corrected for the observed relative humidity. To correct for humidity, SCFM is converted to ACFM by:

$$\text{ACFM} = \frac{14.7}{(BP+LP)} \times \frac{(460+LT)}{528} \times SCFM$$ **Eq.** 2-3

The airflow rate in ACFM is then corrected for relative humidity using Eq. A-1 from the ASCE Standard:

$$\text{Q}_S = 36.2 \times \left[\frac{(BP+LP) \times \left(1 - \frac{Rh \times Pva}{Pb}\right)}{460+LT} \right] \times ACFM$$ **Eq.** 2-4

Where:
Rh = Relative Humidity, %
Pva = Vapor Pressure of Water at ambient temperature
Q_S = Humidity corrected air flow rate, SCFM

Once Q_s has been determined, the value of C" is calculated as follows:

$$\text{C"} = \frac{Q_S}{\sqrt{\frac{(BP+LP)}{(460+LT)}\Delta h}}$$ **Eq.** 2-5

Where:
C" = Humidity corrected C'

The observed airflow rate was converted to SI units as follows:

$$\text{Nm}^3 = SCFM \times 0.62067$$ **Eq.** 2-6

Where:
Nm^3 = Normal Cubic Meters per Minute (1 Atm., 0°C, 0% Rh)

2.2. Horsepower

The blower HP_{motor} can be determined as follows:

$$HP_{motor} = GHP + MHP$$ **Eq.** 2-7

Where:
GHP = Gas Horsepower (From adiabatic compression, shown below)
MHP = Mechanical Horsepower (Loss in gear reducers, etc.)

The basic equation for determining the gas horsepower is:

$$GHP = \frac{W_a \times H_a}{33{,}000 \times \eta_o}$$ **Eq.** 2-8

Where:
W_a = Weight flow of gas, Lbs/Min
H_a = Adiabatic Head, Ft-Lb_f/Lb_m
η_o = Blower Overall Efficiency, %
33,000 = Units Conversion Factor, Ft-Lb_f/Min/HP

The Weight Flow of gas (W_a) can be determined as follows:

$$W_a = ACFM \times \rho$$ **Eq.** 2-9

Where:
ACFM = Actual flow of gas at discharge conditions
ρ = Density of flowing gas at discharge conditions

$$= \frac{MW_m \times (BP + LP)}{10.72 \times (LT + 460)}$$

Where:
MW_m = Molecular Weight of Moist flowing gas

$$= MW_d \times G$$

Where:
MW_d = Molecular Weight of dry gas
G = Specific Gravity of moist gas

$$= 1 - \frac{0.378 \times Rh \times Pv_a}{BP}$$

The Adiabatic Head (H_a) is calculated as follows:

$$H_a = \frac{R \times Ta \times \left[\left(\frac{BP + LP}{BP} \right)^{\frac{k-1}{k}} - 1 \right]}{\frac{k-1}{k}}$$ **Eq.** 2-10

Where:
R = Gas Constant, Ft-Lb_f/Lb_m °R

$$= \frac{1{,}545}{MW_m}$$

k = Ratio of specific heats, C_p/C_v

Four (4) Yellow Springs Instruments (YSI) D.O. probes were installed in the test basin to monitor the dissolved oxygen levels during each test. A YSI Model 556 MPS multi parameter meter and probe was used to monitor water quality (Temp, pH, ORP, TDS, D.O., and Barometric Pressure) during each test. The exact aeration grid arrangement is shown as follows:

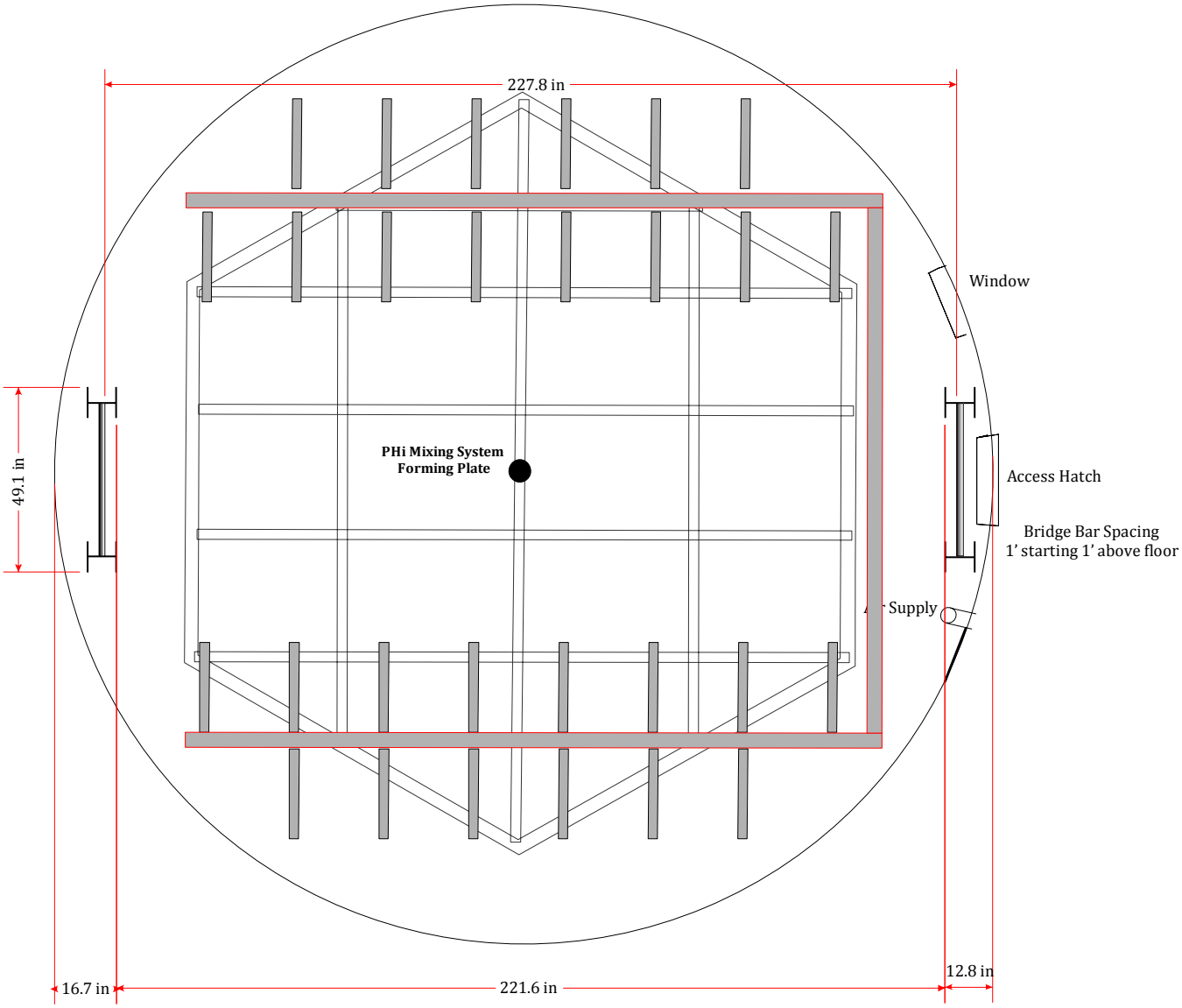


Figure 2-2 – Aeration Gird Arrangement

3. DESCRIPTION OF THE AERATION DEVICES

3.1. Pulsed Hydraulics Inc. (PHi) Mixing System

The Pulsed Hydraulics Inc. (PHi) Mixing System consists of the following:

1. Stainless Steel Forming Plate
2. Kaeser 5HP Compressor
3. Pressure Regulator
4. PLC Control System
5. Rapid Response Injection Valve

3.2. Membrane Tube Diffusers

The fine Bubble membrane tube diffuser aeration system tested consisted of the following:

1. 28 Sanitaire Membrane Tube Diffusers
2. Each diffuser is a 2½"Ø x 24" long EPDM perforated membrane tube

4. TEST PROCEDURES

Before testing, the aeration basin was thoroughly cleaned and filled with potable water.

Four (4) YSI dissolved oxygen meters and probes were placed in the test basin and later used to monitor the dissolved oxygen concentration during each test. The probes were located as follows:

Probe	Probe Depth Below Water Surface (Ft)
1	17
2	3
3	10
4	5
YSI MPS 556	12

Overall test procedures include:

After filling the test basin with tap water, add enough cobalt catalyst to obtain a concentration of cobaltous ion less than 0.1 mg/l. Dissolve the catalyst into the basin contents by running the aeration system a minimum of thirty minutes before testing.

Add enough (100-200% of stoichiometric) sodium sulfite to deoxygenate the tap water in the basin to start each test. Monitor the dissolved oxygen concentration as it depletes then starts to rise, using the *in-situ* dissolved oxygen probes. Measure the water temperature using the D.O. Probe thermisters.

With the aeration system operating at the specified liquid depth, start monitoring as the oxygen concentration increases. Collect data to cover a range of dissolved oxygen concentrations from 1.0 mg/l to 98% of saturation, obtaining a minimum of 100 data points for each probe.

I. The **general test procedures** are:

1. Thoroughly clean the aeration basin before testing and fill with tap water to the desired liquid depth.
2. Operate the aeration system in potable water at the test airflow rate and operating liquid depth for 30 minutes before testing to obtain temperature and mixing equilibrium. Record the liquid temperature a minimum of two times during each test run. Maintain the required airflow rate during testing by monitoring manometers connected across the airflow devices. Monitor operating air pressure and headloss via a mercury manometer. Measure the operating line temperature.
3. Install 4 dissolved oxygen probes with integral stirrers at locations in the test tank as required.
4. Use Cobalt Chloride ($CoCl_2 * 6H_2O$) as a catalyst at a concentration of 0.1 mg/l.
5. Use anhydrous sodium sulfite technical grade (Na_2SO_3) to deoxygenate the test liquid. Add sulfite solution before each test run to decrease the oxygen concentration to zero (1.00 mg/l or less D.O.) and maintained zero for 1 to 3 minutes.
6. Use the azide modification of the Winkler method to calibrate the D.O. probes. Collect a minimum of one-hundred (100) D.O. observations for each D.O. probe between 10 and 98% of saturation.

II. Detailed test procedures:

A. Initial setup

1. Inspect aeration basin for adequate cleanliness, level of diffusers and correct water depth.
2. Check installation of airflow monitoring device.
3. Check D.O. probe thermisters for liquid temperature monitoring.
4. Prepare YSI (Yellow Springs Instruments) Dissolved Oxygen (D.O.) probes for installation.

a) Replace electrolyte solution and membranes on each D.O. probe
b) Connect probes to YSI D.O. meters
c) Check each probe for functioning stirrer mechanism
d) Connect all D.O. meters to computer for data logging

5. Check the placement of each D.O. probe in the test basin.
6. Start the blowers and begin aerating the test tank.
7. Check all air flow meters, gages, valves, and fittings on the air supply system for air leakage.
8. Collect at least two samples from the oxygen saturated aeration basin for analysis using the Winkler titration method to determine the D.O. concentration.
9. Calibrate all D.O. probes and meters to the saturation value determined by the Winkler method.
10. Check installation of the temperature gage in the aeration header piping system for the accurate determination of flowing air temperature.
11. Dissolve Cobalt Chloride into a container of water.
12. Pour Cobalt solution into the aeration basin.
13. Allow a minimum of thirty minutes mixing of the cobalt into the aeration basin before the start of testing.

B. Procedure for clean water aeration testing.

1. Adjust the airflow rate to the test basin to the required test airflow.
2. Read and record the following data:
   a) Site barometric pressure (PSIA)
   b) Operating line pressure from the mercury manometer connected to the header system (PSIG)
   c) Operating line temperature (°F)
   d) Δh from the Annubar, (Inches of H_2O)
   e) Liquid Temperature (°C)
   f) Aeration basin oxygen saturation value C_{s0} (mg/l) [Winkler Analysis]
   g) Ambient temperature
   h) Relative Humidity, %
3. Pump sodium sulfite slurry into the aeration test basin.
4. Begin observing D.O. meters.
5. Monitor D.O. on each of the YSI meters as it drops to 1.0 mg/l.
6. Continue recording D.O. values versus time for each of the D.O. probes, obtaining a minimum of 100 D.O. values for each probe.
7. Stop all recording of D.O. values when the aeration basin has reached $6/K_La$.
8. Collect a basin water sample and analyze for Total Dissolved Solids (TDS – mg/L)
9. Perform non-linear regression analysis on the collected data.
   a) Determine K_La_{20} values for each probe
   b) Calculate SOTR, SOTE, and SAE.
10. Repeat steps 1-9 for each test run.

5. DATA ANALYSIS METHODS

5.1. Standard ASCE Data Analysis Method

The basic mass-transfer model[2] used to determine oxygen transfer is as follows:

[2] Brown, L.C. and Baillod, C.R., "Modeling and Interpreting Oxygen Transfer Data", A.S.C.E. Jour. Environ. Engr. Div., 108, EE4, 607 (1982)

$$\frac{dC}{dT} = K_L a\left(C_\infty^* - C\right) \qquad \textbf{Eq. } 5\text{-}1$$

Which, upon integration, with initial condition C = C_o at t =0, becomes:

(logarithmic form)

$$\ln\left[\frac{C_\infty^* - C}{C_\infty^* - C_o}\right] = -K_L a\ t \qquad \textbf{Eq. 5-2}$$

or

(exponential form)

$$C = C_\infty^* - \left(C_\infty^* - C_O\right)e^{-k_L a\ t} \qquad \textbf{Eq. } 5\text{-}3$$

Where:

C	=	D.O. Concentration, mg/L
C^*_∞	=	Equilibrium D.O. concentration, the concentration obtained as time approaches infinity, mg/L
C_0	=	D.O. concentration at time zero, mg/L
$K_L a$	=	Apparent volumetric mass transfer coefficient, t^{-1}

The overall mass transfer coefficient ($K_L a_T$) is obtained experimentally by aerating deoxygenated water and observing the rate of change of dissolved oxygen (D.O.) concentration about time.

A non-linear regression of D.O. about time is used to determine $K_L a_T$, C^*_∞, and C_o.

The logarithmic form of the mass transfer model can be rearranged to determine $K_L a_T$ using a log-deficit linear regression as follows:

$$K_L a_T = \frac{60}{t_2 - t_1}\ln\left[\frac{C_\infty^* - C_1}{C_\infty^* - C_2}\right] \qquad \textbf{Eq. 5-4}$$

Where:

$K_L a_T$	=	Apparent volumetric mass transfer coefficient at test liquid temperature T, hr^{-1}
C^*_∞	=	The observed saturation concentration of oxygen in the test basin at test temperature and barometric pressure at equilibrium, mg/L after an aeration period equal to $6/K_L a_T$
C_1 and C_2	=	Dissolved oxygen concentration at time t_1 and t_2 respectively, mg/L

For purposes of comparison, $K_L a_T$ must be corrected to standard temperature, 20°C. The appropriate correction has been found empirically to be:

$$K_L a_{20} = K_L a_T \Theta^{(20-T)} \qquad \textbf{Eq. } 5\text{-}5$$

Where:

T	=	test liquid temperature (°C)
Θ	=	1.024 for all T

With the value of $K_L a_{20}$ known, it is possible to calculate the pounds of oxygen transferred to the test liquid at standard conditions of 20°C, maximum oxygen deficit (dissolved oxygen equal to zero), one atmosphere barometric pressure, and alpha and beta equal to 1.0 (clean tap water) for each sample point.

$$\text{SOTR}_i = K_L a_{20i}\, C^*_{\infty 20i}\, V \qquad \textbf{Eq. 5-6}$$

Where:

SOTR$_i$ = pounds of oxygen transferred to the test liquid, lb O_2 /hr, for Probe i

V = Liquid volume of water in the test tank with aerators turned off

C*$_{\infty 20i}$ = $C^*_\infty\left(\frac{1}{\tau\,\Omega}\right)$

τ = Temperature correction factor, C^*_{st}/C^*_{s20}

C*$_{s20}$ = 9.092 mg/L, standard D.O. concentration at 20°C and one atmosphere

C*$_{st}$ = oxygen saturation concentration from **Standard Methods**, mg/L, at test liquid temperature *T*

Ω = Pressure correction factor, P_b/P_s

P$_b$ = Site barometric pressure, PSIA

P$_s$ = Standard barometric pressure, 14.73 PSIA

The overall average value of SOTR is then calculated as the average of the individual SOTR$_i$ values determined for each sample point.

Calculate the standard percent oxygen transfer (SOTE - %) once the oxygen transfer rate is known using the following equation:

$$\text{SOTE} = \frac{SOTR x 100}{SCFM x 1.036} \qquad \textbf{Eq. 5-7}$$

The blower wire HP is determined using the adiabatic compression formula as described in Section 2 of this report.

Calculate the standard aerator efficiency (SAE) using the following equation:

$$\text{SAE} = N_O = \frac{SOTR}{HP} \qquad \textbf{Eq. 5-8}$$

Where:

No = aerator efficiency, lb. O_2/hr-Hp

SOTR = Qo, standard oxygen transfer rate, lb. O_2/hr

HP$_{wire}$ = Blower HP determined by the adiabatic compression formula

Finally, the reported values may be corrected to a standard TDS concentration of 1,000 mg/L using the following:

$$K_L a_{T\ \ TDS\,Corrected} = K_L a_{T\ \ observed} \times e^{(0.0000965 \times [1000 - TDS])} \qquad \textbf{Eq. 5-9}$$

Where:

TDS = Observed Total Dissolved Solids concentration for each run, mg/L

All values are then recalculated based on the corrected $K_L a_T$.

6. DISCUSSION OF RESULTS

Table 6-1 is a summary of the results of the GSEE, Inc. analysis of the data obtained during the oxygen transfer testing on the Pulsed Hydraulics Inc. (PHi) Mixing System. Individual computer printouts of

the data analysis including time versus D.O. plots for each test run using the specified data analysis method are contained in Appendix 9.1.

Table 6-1 Summary of Oxygen Transfer Test Results

DATE:	7-Nov-06	8-Nov-06	8-Nov-06	9-Nov-06
RUN:	1	2	3	4
Barometric Pres. (PSIA)	14.18	14.19	14.18	14.23
Ambient Temperature (°F)	57.0	61.8	64.4	67.9
Relative Humidity (%)	0.68	0.68	0.64	0.57
Line Pressure (PSIG)	45.02	8.87	8.87	45.02
Line Temperature (°F)	57	130	136	68
Water Temp. (°C)	14.61	14.61	14.70	14.96
Orifice Diameter (in)	1.840	1.349	1.349	1.840
Number Of Aeration Devices	1	28	28	1
Side Water Depth (ft)	20.00	19.75	19.75	19.25
Air Release Depth (ft)	20.00	18.75	18.75	19.25
Tank Diameter (ft)	21.00	21.00	21.00	21.00
Average Air Flow (SCFM)	**25**	**41**	**40**	**38**
Average Air Flow (SCFM/Tube)	25.11	1.47	1.43	37.93
C*20 Standard Conditions	9.62	10.74	10.72	9.16
Tank Volume (Ft^3)	6,927	6,841	6,841	6,667
TDS (mg/L)	318	452	568	676
KLa20 (hr^{-1})	**0.15**	**2.43**	**2.90**	**0.12**
SOTR (Lb O_2/Hr)	**0.6**	**11.2**	**13.3**	**0.5**
SOTE OBSERVED (%)	**2.4%**	**26.2%**	**32.1%**	**1.2%**
TDS Corrected Results				
KLa20 (hr^{-1})	**0.16**	**2.57**	**3.02**	**0.13**
SOTR (Lb O_2/Hr)	**0.7**	**11.8**	**13.9**	**0.5**
SOTE OBSERVED (%)	**2.6%**	**27.7%**	**33.5%**	**1.2%**
SOTE (%/Ft)	**0.13%**	**1.48%**	**1.79%**	**0.06%**

Tests 1 and 4 were performed with only the PHi mixing system in operation. Test 4 was performed using a faster response valve than the one used in tests 1 and 3. Tests 2 was performed using only the 28 fine bubble membrane tube diffusers. Tests 3 used both the membrane tube diffusers and the PHi mixing system.

Note that the PHi mixing system was operated at 65 PSIG rather than 45 PSIG during test 3. The pressure was increased based on visual observation. The increased pressure was required so that the mixing pattern established the PHi Mixing System would overpower the mixing pattern of the membrane tube diffusers. The increased pressure increased the air flow of the PHi Mixing system from 25 SCFM (6.1 ACFM) observed in Test 1 to 43.7 SCFM (8.1 ACFM) in Test 3. This means an estimated increase in the SOTR from 0.67 lb O2/Hr for Test 1 to 1.16 lb O2/Hr for Test 3.

Test 2 indicates that the membrane tube diffusers provide 11.83 lb O2/Hr at an air flow rate of 41 SCFM. The combination of membrane tubes and PHi Mixing System in Test 3 produced 13.89 lb O2/Hr. The sum of the individual tests indicate an oxygen transfer of 12.99 lb O2/hr (11.83+1.16). The combination of the membrane tube diffusers with the PHi Mixing System shows an overall oxygen transfer enhancement of 7.6%.

The Oxygen transfer produced by the PHi Mixing System is significantly lower than equivalent coarse bubble aeration. Coarse bubble aeration typically produces Standard Oxygen Transfer Efficiencies of 0.6% to 0.9% per foot of submergence at depths less than 30'. During Test 1 the PHi Mixing System only produced an SOTE of 0.13% per foot of submergence. Using the faster response valve in Test 4, the SOTE was cut in half to only 0.06% per foot of submergence.

7. CONCLUSSIONS AND RECOMMENDATIONS

The results of the unsteady state clean water oxygen transfer tests on the Pulsed Hydraulics Inc. (PHi) Mixing System indicate the following:

1. Oxygen transfer (SOTE) is less than 1/10 that of comparable coarse bubble aeration systems.
2. Combining the PHi Mixing System with a typical fine bubble aeration system enhanced SOTR by 7.6% above the sum of the individual systems.

8. CERTIFICATION

GSEE, Inc., certifies that the results presented in this report are accurate and were obtained using the test procedures described above.

Gerald L. Shell, PE

9. APPENDIX

9.1. Regression Analysis Printouts

GSEE, Inc.

Environmental Services

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: PHi Unit Alone - Pumping
DATE: 7-Nov-06
RUN: 1

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

	Initial	Mid Point	Final
Barometric Pres. (PSIA)	14.186	14.178	14.172
(mm Hg)	733.60	733.20	732.90
Ambient Temperature (°F)	61.90	55.00	54.00
Relative Humidity (%)	68%	68%	68%
Line Pressure (PSIG)	44.943	45.188	44.943
(In. Hg)	91.50	92.00	91.50
Line Temperature (°F)	61.90	55.00	54.00
ΔH Air Flow Dev. 1 (Annubar)	0.002	0.002	0.002
ΔH Air Flow Dev. 2 (Orifice)	0.089	0.089	0.089
ΔH Air Flow Dev. 3 (Annubar)	NA	NA	NA
ΔH Air Flow Dev. 4 (Annubar)	NA	NA	NA
Water Temp. (°C)	14.70	14.60	14.54
Orifice Diameter (in)		1.840	
Number Of Aeration Devices		1	
Side Water Depth (ft)		20.00	(6.08 m)
Air Release Depth (ft)		20.00	(6.08 m)
Tank Length (ft)		0.00	(0.00 m)
Tank Width (ft)		0.00	(0.00 m)
Tank Diameter (ft)		21.00	(6.38 m)
Gear Reducer or Belt Efficiency		100.0%	
Motor Efficiency		93.0%	
Total HP_{wire} av.		3.76	(2.80 kw)

C' Air Flow Device 1 (Annubar)	1,522.09
Air Flow Device 1 (SCFM)	25.08
C' Air Flow Device 2 (Orifce)	249.82
Air Flow Device 2 (SCFM)	25.15
Average Air Flow (SCFM)	25.11
Effective Depth Correction (f)	0.10
Headloss (In. H_2O)	1,006.35
C* (mg/l)	10.40
CsmT (Standard Methods, mg/l)	10.17
C^*_{20} Standard Conditions	9.62
Tank Volume (Ft³)	6,927.2
(Gallons)	51,819.1
(m³)	196.2
(Million Pounds)	0.432
#Na_2SO_3 @ 160% Stoichiometric	57
Cobalt Concen. (mg/l)	0.100
Grams Cobalt Chloride	80.9
Total HP_{motor} av.	3.50
TDS (mg/L)	318.00

NON-LINEAR REGRESSION RESULTS

Probe	K_{LaT}	K_{La20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Std. Err.
1	0.13	0.15	0.62	0.62	2.37	0.16	10.40	0.0654
NA	NA	NA	NA	NA	NA	NA	NA	NA
3	0.13	0.14	0.60	0.60	2.29	0.16	10.40	0.0115
4	0.14	0.16	0.66	0.66	2.53	0.17	10.40	0.0392
avg.	0.13	0.15	0.62	0.62	2.40	0.17	10.40	0.0387
Avg	*0.13*	*0.15*	*0.62*	*0.62*	*2.37*	*0.16*	*10.40*	Exclude Max&Min
TDS	***0.14***	***0.16***	***0.67***	***0.67***	***2.56***	***0.18***	***10.40***	***0.128%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-WHP		

OXYGEN TRANSFER

Total SCFM:	**25.1**	**40.375**	**:Nm³/Hr**	**11.852**	**L/s**	**#O2/Hr:**	**0.67**	**0.302**	**:KgO2/Hr**
SCFM/Diff.:	**25.11**	**40.375**	**:Nm³/hr/Diff**			**#O2/Hr/Diff.:**	**0.67**	**0.302**	**:KgO2/Hr/Diff.**
SCFM/KCF:	**3.6**	**0.206**	**:Nm³/hr/m³**			**#O2/Day:**	**16.0**	**7.2**	**:KgO2/Day**
Total ICFM:	**25.5**	**12.05**	**L/s**			**#O2/Day/1000 Ft³:**	**2**	**0.04**	**:KgO2/Day/m³**

LINEAR REGRESSION RESULTS

Probe	K_{LaT}	K_{La20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Corr.Coeff.
1	0.12	0.14	0.58	0.58	2.22	0.15	10.48	0.9973
NA	NA	NA	NA	NA	NA	NA	NA	NA
3	0.13	0.14	0.59	0.59	2.28	0.16	10.33	0.9999
4	0.14	0.15	0.64	0.64	2.47	0.17	10.40	0.9996
avg.	0.13	0.15	0.60	0.60	2.32	0.16	10.41	0.9990
Avg	*0.13*	*0.14*	*0.60*	*0.60*	*2.30*	*0.16*	*10.40*	Exclude Max&Min
TDS	***0.14***	***0.15***	***0.65***	***0.65***	***2.48***	***0.17***	***10.41***	
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-HPw		

EUROPEAN STANDARD

Probe	K_{LaT}	K_{La10}	SOTR	SOTR/Dev	SAE	C*	
1	0.13	0.11	0.27	0.27	0.09	10.40	
NA	NA	NA	NA	NA	NA	NA	
3	0.13	0.11	0.27	0.27	0.10	10.40	
4	0.14	0.12	0.29	0.29	0.10	10.40	
NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	
avg.	0.13	0.12	0.27	0.27	0.10	10.40	
Avg	*0.13*	*0.11*	*0.27*	*0.27*	*0.10*	*10.40*	Exclude Max&Min
TDS	***0.14***	***0.12***	***0.29***	***0.29***	***0.10***	***10.40***	
Corrected	/hr	/hr	kg O_2/hr		kg O_2/hr-kw	mg/L	

Pt. 1	est.	calc.		Pt. 2	Not Used	Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.02	1.02				C0	1.03	1.03		C0	2.21	2.21	
Kla-in	0.13	0.13				Kla-in	0.13	0.13		Kla-in	0.14	0.14	
C*	10.40	10.40				C*	10.40	10.40		C*	10.40	10.40	
Sq.Diff.	1.2718					Sq.Diff.	0.0391			Sq.Diff.	0.4566		
Time	D.O.	D.O.calc	diff			Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	1.02	1.0	0.0			0.00	1.04	1.0	0.0	0.00	2.22	2.2	0.0
1.00	1.04	1.0	0.0			1.00	1.08	1.1	0.0	1.00	2.30	2.2	0.1
2.00	1.06	1.1	0.0			2.00	1.08	1.1	0.0	2.00	2.32	2.2	0.1
3.00	1.07	1.1	0.0			3.00	1.09	1.1	0.0	3.00	2.34	2.3	0.1
4.00	1.12	1.1	0.0			4.00	1.13	1.1	0.0	4.00	2.32	2.3	0.0
5.00	1.13	1.1	0.0			5.00	1.14	1.1	0.0	5.00	2.34	2.3	0.0
6.00	1.17	1.1	0.0			6.00	1.15	1.1	0.0	6.00	2.36	2.3	0.0
7.00	1.17	1.2	0.0			7.00	1.16	1.2	0.0	7.00	2.36	2.3	0.0
8.00	1.18	1.2	0.0			8.00	1.18	1.2	0.0	8.00	2.37	2.4	0.0
9.00	1.24	1.2	0.0			9.00	1.20	1.2	0.0	9.00	2.36	2.4	0.0
10.00	1.26	1.2	0.0			10.00	1.23	1.2	0.0	10.00	2.42	2.4	0.0
11.00	1.28	1.2	0.0			11.00	1.25	1.2	0.0	11.00	2.44	2.4	0.0
12.00	1.27	1.3	0.0			12.00	1.27	1.3	0.0	12.00	2.47	2.4	0.0
13.00	1.30	1.3	0.0			13.00	1.28	1.3	0.0	13.00	2.47	2.5	0.0
14.00	1.30	1.3	0.0			14.00	1.31	1.3	0.0	14.00	2.50	2.5	0.0
15.00	1.33	1.3	0.0			15.00	1.31	1.3	0.0	15.00	2.52	2.5	0.0
16.00	1.35	1.3	0.0			16.00	1.32	1.3	0.0	16.00	2.52	2.5	0.0
17.00	1.37	1.4	0.0			17.00	1.37	1.4	0.0	17.00	2.54	2.5	0.0
18.00	1.43	1.4	0.1			18.00	1.38	1.4	0.0	18.00	2.47	2.5	-0.1
19.00	1.42	1.4	0.0			19.00	1.40	1.4	0.0	19.00	2.58	2.6	0.0
20.00	1.43	1.4	0.0			20.00	1.43	1.4	0.0	20.00	2.59	2.6	0.0
21.00	1.41	1.4	0.0			21.00	1.45	1.4	0.0	21.00	2.58	2.6	0.0
22.00	1.47	1.5	0.0			22.00	1.47	1.5	0.0	22.00	2.61	2.6	0.0
23.00	1.51	1.5	0.0			23.00	1.48	1.5	0.0	23.00	2.62	2.6	0.0
24.00	1.50	1.5	0.0			24.00	1.50	1.5	0.0	24.00	2.67	2.7	0.0
25.00	1.57	1.5	0.0			25.00	1.51	1.5	0.0	25.00	2.67	2.7	0.0
26.00	1.57	1.5	0.0			26.00	1.53	1.5	0.0	26.00	2.71	2.7	0.0
27.00	1.58	1.6	0.0			27.00	1.55	1.5	0.0	27.00	2.72	2.7	0.0
28.00	1.60	1.6	0.0			28.00	1.57	1.6	0.0	28.00	2.75	2.7	0.0
29.00	1.59	1.6	0.0			29.00	1.60	1.6	0.0	29.00	2.75	2.7	0.0
30.00	1.57	1.6	0.0			30.00	1.61	1.6	0.0	30.00	2.76	2.8	0.0
31.00	1.60	1.6	0.0			31.00	1.61	1.6	0.0	31.00	2.81	2.8	0.0
32.00	1.64	1.7	0.0			32.00	1.62	1.6	0.0	32.00	2.77	2.8	0.0
33.00	1.69	1.7	0.0			33.00	1.66	1.7	0.0	33.00	2.76	2.8	-0.1
34.00	1.67	1.7	0.0			34.00	1.66	1.7	0.0	34.00	2.78	2.8	0.0
35.00	1.72	1.7	0.0			35.00	1.71	1.7	0.0	35.00	2.82	2.8	0.0
36.00	1.70	1.7	0.0			36.00	1.72	1.7	0.0	36.00	2.85	2.9	0.0
37.00	1.76	1.7	0.0			37.00	1.73	1.7	0.0	37.00	2.87	2.9	0.0
38.00	1.76	1.8	0.0			38.00	1.75	1.7	0.0	38.00	2.90	2.9	0.0
39.00	1.75	1.8	0.0			39.00	1.77	1.8	0.0	39.00	2.91	2.9	0.0
40.00	1.82	1.8	0.0			40.00	1.78	1.8	0.0	40.00	2.91	2.9	0.0
41.00	1.82	1.8	0.0			41.00	1.81	1.8	0.0	41.00	2.93	3.0	0.0
42.00	1.84	1.8	0.0			42.00	1.81	1.8	0.0	42.00	2.95	3.0	0.0
43.00	1.88	1.9	0.0			43.00	1.85	1.8	0.0	43.00	2.94	3.0	0.0
44.00	1.90	1.9	0.0			44.00	1.85	1.9	0.0	44.00	2.97	3.0	0.0
45.00	1.90	1.9	0.0			45.00	1.89	1.9	0.0	45.00	2.99	3.0	0.0
46.00	1.95	1.9	0.0			46.00	1.87	1.9	0.0	46.00	3.01	3.0	0.0
47.00	1.94	1.9	0.0			47.00	1.89	1.9	0.0	47.00	3.03	3.1	0.0
48.00	1.93	2.0	0.0			48.00	1.94	1.9	0.0	48.00	3.03	3.1	0.0
49.00	1.99	2.0	0.0			49.00	1.95	1.9	0.0	49.00	3.06	3.1	0.0
50.00	1.97	2.0	0.0			50.00	1.97	2.0	0.0	50.00	3.06	3.1	0.0
51.00	1.98	2.0	0.0			51.00	1.99	2.0	0.0	51.00	3.11	3.1	0.0
52.00	2.04	2.0	0.0			52.00	1.99	2.0	0.0	52.00	3.11	3.1	0.0
53.00	2.07	2.0	0.0			53.00	2.01	2.0	0.0	53.00	3.13	3.2	0.0
54.00	2.07	2.1	0.0			54.00	2.03	2.0	0.0	54.00	3.19	3.2	0.0
55.00	2.12	2.1	0.0			55.00	2.06	2.1	0.0	55.00	3.18	3.2	0.0
56.00	2.09	2.1	0.0			56.00	2.08	2.1	0.0	56.00	3.19	3.2	0.0
57.00	2.10	2.1	0.0			57.00	2.08	2.1	0.0	57.00	3.23	3.2	0.0
58.00	2.11	2.1	0.0			58.00	2.12	2.1	0.0	58.00	3.24	3.2	0.0
59.00	2.12	2.2	0.0			59.00	2.12	2.1	0.0	59.00	3.26	3.3	0.0
60.00	2.15	2.2	0.0			60.00	2.14	2.1	0.0	60.00	3.26	3.3	0.0
61.00	2.16	2.2	0.0			61.00	2.18	2.2	0.0	61.00	3.28	3.3	0.0
62.00	2.20	2.2	0.0			62.00	2.17	2.2	0.0	62.00	3.30	3.3	0.0
63.00	2.24	2.2	0.0			63.00	2.21	2.2	0.0	63.00	3.30	3.3	0.0
64.00	2.24	2.2	0.0			64.00	2.22	2.2	0.0	64.00	3.34	3.3	0.0
65.00	2.18	2.3	-0.1			65.00	2.22	2.2	0.0	65.00	3.35	3.4	0.0
66.00	2.25	2.3	0.0			66.00	2.24	2.2	0.0	66.00	3.38	3.4	0.0
67.00	2.26	2.3	0.0			67.00	2.25	2.3	0.0	67.00	3.37	3.4	0.0
68.00	2.31	2.3	0.0			68.00	2.29	2.3	0.0	68.00	3.40	3.4	0.0
69.00	2.34	2.3	0.0			69.00	2.29	2.3	0.0	69.00	3.40	3.4	0.0
70.00	2.38	2.3	0.0			70.00	2.31	2.3	0.0	70.00	3.42	3.4	0.0
71.00	2.36	2.4	0.0			71.00	2.32	2.3	0.0	71.00	3.43	3.5	0.0
72.00	2.30	2.4	-0.1			72.00	2.33	2.3	0.0	72.00	3.44	3.5	0.0
73.00	2.38	2.4	0.0			73.00	2.34	2.4	0.0	73.00	3.44	3.5	0.0
74.00	2.45	2.4	0.0			74.00	2.38	2.4	0.0	74.00	3.48	3.5	0.0
75.00	2.49	2.4	0.1			75.00	2.38	2.4	0.0	75.00	3.50	3.5	0.0
76.00	2.41	2.4	0.0			76.00	2.42	2.4	0.0	76.00	3.44	3.5	-0.1
77.00	2.48	2.5	0.0			77.00	2.42	2.4	0.0	77.00	3.60	3.5	0.1

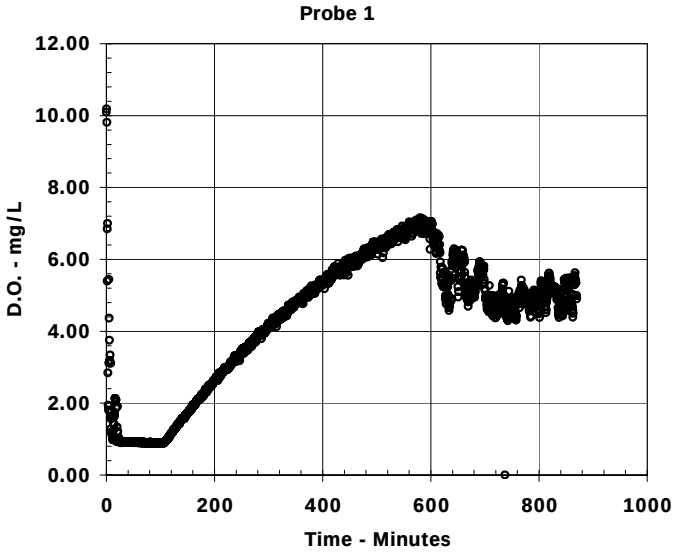
Pt. 1	est.	calc.		Pt. 2	Not Used	Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.02	1.02				C0	1.03	1.03		C0	2.21	2.21	
Kla-in	0.13	0.13				Kla-in	0.13	0.13		Kla-in	0.14	0.14	
C*	10.40	10.40				C*	10.40	10.40		C*	10.40	10.40	
Sq.Diff.	1.2718					Sq.Diff.	0.0391			Sq.Diff.	0.4566		
Time	D.O.	D.O.calc	diff			Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
78.00	2.48	2.5	0.0			78.00	2.43	2.4	0.0	78.00	3.56	3.6	0.0
79.00	2.53	2.5	0.0			79.00	2.45	2.5	0.0	79.00	3.53	3.6	0.0
80.00	2.52	2.5	0.0			80.00	2.47	2.5	0.0	80.00	3.56	3.6	0.0
81.00	2.53	2.5	0.0			81.00	2.50	2.5	0.0	81.00	3.59	3.6	0.0
82.00	2.51	2.6	0.0			82.00	2.50	2.5	0.0	82.00	3.61	3.6	0.0
83.00	2.56	2.6	0.0			83.00	2.52	2.5	0.0	83.00	3.59	3.6	-0.1
84.00	2.63	2.6	0.0			84.00	2.54	2.5	0.0	84.00	3.53	3.7	-0.1
85.00	2.60	2.6	0.0			85.00	2.57	2.6	0.0	85.00	3.76	3.7	0.1
86.00	2.66	2.6	0.0			86.00	2.57	2.6	0.0	86.00	3.59	3.7	-0.1
87.00	2.63	2.6	0.0			87.00	2.58	2.6	0.0	87.00	3.60	3.7	-0.1
88.00	2.69	2.7	0.0			88.00	2.62	2.6	0.0	88.00	3.65	3.7	-0.1
89.00	2.74	2.7	0.1			89.00	2.63	2.6	0.0	89.00	3.74	3.7	0.0
90.00	2.73	2.7	0.0			90.00	2.62	2.6	0.0	90.00	3.78	3.7	0.0
91.00	2.69	2.7	0.0			91.00	2.66	2.7	0.0	91.00	3.82	3.8	0.1
92.00	2.63	2.7	-0.1			92.00	2.69	2.7	0.0	92.00	3.83	3.8	0.0
93.00	2.74	2.7	0.0			93.00	2.70	2.7	0.0	93.00	3.85	3.8	0.1
94.00	2.84	2.8	0.1			94.00	2.70	2.7	0.0	94.00	3.88	3.8	0.1
95.00	2.75	2.8	0.0			95.00	2.70	2.7	0.0	95.00	3.84	3.8	0.0
96.00	2.81	2.8	0.0			96.00	2.70	2.7	0.0	96.00	3.80	3.8	0.0
97.00	2.78	2.8	0.0			97.00	2.74	2.8	0.0	97.00	3.87	3.9	0.0
98.00	2.82	2.8	0.0			98.00	2.76	2.8	0.0	98.00	3.87	3.9	0.0
99.00	2.84	2.8	0.0			99.00	2.79	2.8	0.0	99.00	3.88	3.9	0.0
100.00	2.89	2.9	0.0			100.00	2.80	2.8	0.0	100.00	3.93	3.9	0.0
101.00	2.83	2.9	0.0			101.00	2.81	2.8	0.0	101.00	3.97	3.9	0.1
102.00	2.88	2.9	0.0			102.00	2.82	2.8	0.0	102.00	3.95	3.9	0.0
103.00	2.88	2.9	0.0			103.00	2.85	2.9	0.0	103.00	3.97	3.9	0.0
104.00	2.97	2.9	0.1			104.00	2.86	2.9	0.0	104.00	3.97	4.0	0.0
105.00	2.95	2.9	0.0			105.00	2.87	2.9	0.0	105.00	4.02	4.0	0.0
106.00	2.95	3.0	0.0			106.00	2.89	2.9	0.0	106.00	4.03	4.0	0.0
107.00	2.92	3.0	0.0			107.00	2.92	2.9	0.0	107.00	3.95	4.0	-0.1
108.00	2.97	3.0	0.0			108.00	2.94	2.9	0.0	108.00	4.06	4.0	0.0
109.00	2.96	3.0	0.0			109.00	2.94	2.9	0.0	109.00	3.97	4.0	-0.1
110.00	2.93	3.0	-0.1			110.00	2.97	3.0	0.0	110.00	4.08	4.1	0.0
111.00	2.95	3.0	-0.1			111.00	2.98	3.0	0.0	111.00	4.12	4.1	0.1
112.00	3.00	3.0	0.0			112.00	2.98	3.0	0.0	112.00	4.09	4.1	0.0
113.00	3.01	3.1	-0.1			113.00	2.98	3.0	0.0	113.00	4.13	4.1	0.0
114.00	3.05	3.1	0.0			114.00	3.00	3.0	0.0	114.00	4.12	4.1	0.0
115.00	3.14	3.1	0.0			115.00	3.03	3.0	0.0	115.00	4.14	4.1	0.0
116.00	3.07	3.1	0.0			116.00	3.04	3.1	0.0	116.00	4.15	4.1	0.0
117.00	3.08	3.1	0.0			117.00	3.06	3.1	0.0	117.00	4.18	4.2	0.0
118.00	3.16	3.1	0.0			118.00	3.08	3.1	0.0	118.00	4.18	4.2	0.0
119.00	3.14	3.2	0.0			119.00	3.10	3.1	0.0	119.00	4.20	4.2	0.0
120.00	3.20	3.2	0.0			120.00	3.12	3.1	0.0	120.00	4.14	4.2	-0.1
121.00	3.22	3.2	0.0			121.00	3.13	3.1	0.0	121.00	4.27	4.2	0.1
122.00	3.22	3.2	0.0			122.00	3.17	3.1	0.0	122.00	4.23	4.2	0.0
123.00	3.25	3.2	0.0			123.00	3.17	3.2	0.0	123.00	4.26	4.2	0.0
124.00	3.19	3.2	0.0			124.00	3.17	3.2	0.0	124.00	4.26	4.3	0.0
126.00	3.27	3.3	0.0			126.00	3.19	3.2	0.0	126.00	4.31	4.3	0.0
128.00	3.17	3.3	-0.1			128.00	3.23	3.2	0.0	128.00	4.23	4.3	-0.1
130.00	3.31	3.3	0.0			130.00	3.26	3.3	0.0	130.00	4.33	4.3	0.0
132.00	3.24	3.4	-0.1			132.00	3.29	3.3	0.0	132.00	4.37	4.4	0.0
134.00	3.38	3.4	0.0			134.00	3.33	3.3	0.0	134.00	4.41	4.4	0.0
136.00	3.41	3.4	0.0			136.00	3.37	3.4	0.0	136.00	4.44	4.4	0.0
138.00	3.51	3.5	0.1			138.00	3.38	3.4	0.0	138.00	4.43	4.4	0.0
140.00	3.51	3.5	0.0			140.00	3.42	3.4	0.0	140.00	4.48	4.5	0.0
142.00	3.53	3.5	0.0			142.00	3.43	3.4	0.0	142.00	4.46	4.5	0.0
144.00	3.56	3.5	0.0			144.00	3.47	3.5	0.0	144.00	4.53	4.5	0.0
146.00	3.52	3.6	0.0			146.00	3.50	3.5	0.0	146.00	4.56	4.6	0.0
148.00	3.61	3.6	0.0			148.00	3.53	3.5	0.0	148.00	4.58	4.6	0.0
150.00	3.67	3.6	0.0			150.00	3.55	3.6	0.0	150.00	4.64	4.6	0.0
152.00	3.60	3.7	-0.1			152.00	3.59	3.6	0.0	152.00	4.64	4.6	0.0
154.00	3.64	3.7	0.0			154.00	3.61	3.6	0.0	154.00	4.66	4.7	0.0
156.00	3.76	3.7	0.0			156.00	3.65	3.6	0.0	156.00	4.67	4.7	0.0
158.00	3.67	3.7	-0.1			158.00	3.67	3.7	0.0	158.00	4.71	4.7	0.0
160.00	3.82	3.8	0.0			160.00	3.69	3.7	0.0	160.00	4.74	4.7	0.0
162.00	3.77	3.8	0.0			162.00	3.73	3.7	0.0	162.00	4.78	4.8	0.0
164.00	3.84	3.8	0.0			164.00	3.75	3.8	0.0	164.00	4.76	4.8	0.0
166.00	3.85	3.9	0.0			166.00	3.78	3.8	0.0	166.00	4.82	4.8	0.0
168.00	3.99	3.9	0.1			168.00	3.81	3.8	0.0	168.00	4.84	4.8	0.0
170.00	3.90	3.9	0.0			170.00	3.83	3.8	0.0	170.00	4.88	4.9	0.0
172.00	3.98	3.9	0.0			172.00	3.86	3.9	0.0	172.00	4.86	4.9	0.0
174.00	3.93	4.0	0.0			174.00	3.90	3.9	0.0	174.00	4.92	4.9	0.0
176.00	3.97	4.0	0.0			176.00	3.92	3.9	0.0	176.00	4.96	5.0	0.0
178.00	3.94	4.0	-0.1			178.00	3.94	3.9	0.0	178.00	4.86	5.0	-0.1
180.00	3.98	4.1	-0.1			180.00	3.96	4.0	0.0	180.00	5.01	5.0	0.0
182.00	4.10	4.1	0.0			182.00	3.99	4.0	0.0	182.00	5.03	5.0	0.0
184.00	4.06	4.1	-0.1			184.00	4.04	4.0	0.0	184.00	5.07	5.1	0.0
186.00	4.14	4.1	0.0			186.00	4.05	4.1	0.0	186.00	5.09	5.1	0.0

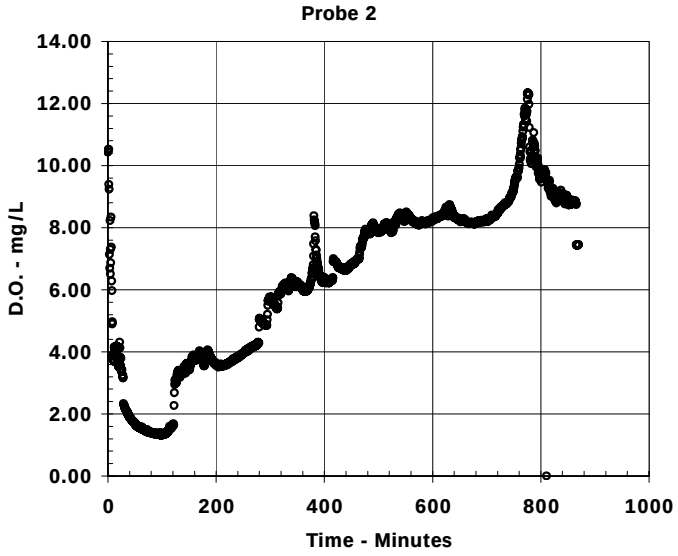
Pt. 1	est.	calc.		Pt. 2	Not Used	Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.02	1.02				C0	1.03	1.03		C0	2.21	2.21	
Kla-in	0.13	0.13				Kla-in	0.13	0.13		Kla-in	0.14	0.14	
C*	10.40	10.40				C*	10.40	10.40		C*	10.40	10.40	
Sq.Diff.	1.2718					Sq.Diff.	0.0391			Sq.Diff.	0.4566		
Time	D.O.	D.O.calc	diff			Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
188.00	4.17	4.2	0.0			188.00	4.07	4.1	0.0	188.00	5.07	5.1	0.0
190.00	4.12	4.2	-0.1			190.00	4.10	4.1	0.0	190.00	5.12	5.1	0.0
192.00	4.25	4.2	0.0			192.00	4.12	4.1	0.0	192.00	5.18	5.1	0.0
194.00	4.30	4.2	0.1			194.00	4.16	4.2	0.0	194.00	5.20	5.2	0.0
196.00	4.33	4.3	0.1			196.00	4.18	4.2	0.0	196.00	5.21	5.2	0.0
198.00	4.32	4.3	0.0			198.00	4.19	4.2	0.0	198.00	5.20	5.2	0.0
200.00	4.12	4.3	-0.2			200.00	4.23	4.2	0.0	200.00	5.21	5.2	0.0
202.00	4.25	4.4	-0.1			202.00	4.25	4.3	0.0	202.00	5.30	5.3	0.0
204.00	4.45	4.4	0.1			204.00	4.29	4.3	0.0	204.00	5.30	5.3	0.0
206.00	4.43	4.4	0.0			206.00	4.32	4.3	0.0	206.00	5.31	5.3	0.0
208.00	4.38	4.4	0.0			208.00	4.35	4.3	0.0	208.00	5.35	5.3	0.0
210.00	4.48	4.5	0.0			210.00	4.35	4.4	0.0	210.00	5.32	5.4	0.0
212.00	4.36	4.5	-0.1			212.00	4.39	4.4	0.0	212.00	5.33	5.4	-0.1
214.00	4.55	4.5	0.0			214.00	4.42	4.4	0.0	214.00	5.45	5.4	0.0
216.00	4.49	4.5	0.0			216.00	4.44	4.4	0.0	216.00	5.45	5.4	0.0
218.00	4.54	4.6	0.0			218.00	4.45	4.5	0.0	218.00	5.49	5.5	0.0
220.00	4.59	4.6	0.0			220.00	4.48	4.5	0.0	220.00	5.51	5.5	0.0
222.00	4.73	4.6	0.1			222.00	4.50	4.5	0.0	222.00	5.49	5.5	0.0
224.00	4.67	4.6	0.0			224.00	4.54	4.5	0.0	224.00	5.54	5.5	0.0
226.00	4.60	4.7	-0.1			226.00	4.57	4.6	0.0	226.00	5.55	5.5	0.0
228.00	4.66	4.7	0.0			228.00	4.59	4.6	0.0	228.00	5.59	5.6	0.0
230.00	4.81	4.7	0.1			230.00	4.60	4.6	0.0	230.00	5.60	5.6	0.0
232.00	4.75	4.7	0.0			232.00	4.62	4.6	0.0	232.00	5.61	5.6	0.0
234.00	4.72	4.8	0.0			234.00	4.67	4.7	0.0	234.00	5.65	5.6	0.0
236.00	4.85	4.8	0.1			236.00	4.68	4.7	0.0	236.00	5.59	5.7	-0.1
238.00	4.87	4.8	0.1			238.00	4.71	4.7	0.0	238.00	5.71	5.7	0.0
240.00	4.86	4.8	0.0			240.00	4.72	4.7	0.0	240.00	5.66	5.7	0.0
242.00	4.89	4.9	0.0			242.00	4.77	4.8	0.0	242.00	5.73	5.7	0.0
244.00	4.84	4.9	0.0			244.00	4.77	4.8	0.0	244.00	5.77	5.7	0.0
246.00	4.89	4.9	0.0			246.00	4.80	4.8	0.0	246.00	5.77	5.8	0.0
248.00	4.92	4.9	0.0			248.00	4.83	4.8	0.0	248.00	5.82	5.8	0.0
250.00	4.97	5.0	0.0			250.00	4.86	4.9	0.0	250.00	5.84	5.8	0.0
252.00	5.04	5.0	0.1			252.00	4.87	4.9	0.0	252.00	5.73	5.8	-0.1
254.00	5.04	5.0	0.0			254.00	4.89	4.9	0.0	254.00	5.90	5.9	0.0
256.00	5.04	5.0	0.0			256.00	4.93	4.9	0.0	256.00	5.92	5.9	0.1
258.00	5.07	5.0	0.0			258.00	4.94	4.9	0.0	258.00	5.90	5.9	0.0
260.00	5.14	5.1	0.1			260.00	4.97	5.0	0.0	260.00	5.97	5.9	0.1
262.00	5.09	5.1	0.0			262.00	5.01	5.0	0.0	262.00	5.94	5.9	0.0
264.00	5.13	5.1	0.0			264.00	5.03	5.0	0.0	264.00	5.98	6.0	0.0
266.00	5.18	5.1	0.0			266.00	5.06	5.0	0.0	266.00	6.02	6.0	0.0
268.00	5.21	5.2	0.1			268.00	5.06	5.1	0.0	268.00	6.00	6.0	0.0
270.00	5.11	5.2	-0.1			270.00	5.09	5.1	0.0	270.00	5.94	6.0	-0.1
272.00	5.14	5.2	-0.1			272.00	5.10	5.1	0.0	272.00	6.02	6.0	0.0
274.00	5.22	5.2	0.0			274.00	5.13	5.1	0.0	274.00	6.10	6.1	0.0
276.00	5.22	5.3	0.0			276.00	5.17	5.1	0.0	276.00	6.14	6.1	0.1
278.00	5.26	5.3	0.0			278.00	5.19	5.2	0.0	278.00	6.00	6.1	-0.1
280.00	5.26	5.3	0.0			280.00	5.20	5.2	0.0	280.00	6.02	6.1	-0.1
282.00	5.38	5.3	0.1			282.00	5.22	5.2	0.0	282.00	6.18	6.1	0.0
284.00	5.36	5.3	0.0			284.00	5.27	5.2	0.0	284.00	6.20	6.2	0.0
286.00	5.40	5.4	0.0			286.00	5.27	5.3	0.0	286.00	6.21	6.2	0.0
288.00	5.39	5.4	0.0			288.00	5.29	5.3	0.0	288.00	6.18	6.2	0.0
290.00	5.40	5.4	0.0			290.00	5.31	5.3	0.0	290.00	6.21	6.2	0.0
292.00	5.42	5.4	0.0			292.00	5.33	5.3	0.0	292.00	6.19	6.2	0.0
294.00	5.54	5.4	0.1			294.00	5.34	5.3	0.0	294.00	6.19	6.3	-0.1
296.00	5.43	5.5	0.0			296.00	5.36	5.4	0.0	296.00	6.29	6.3	0.0
298.00	5.41	5.5	-0.1			298.00	5.40	5.4	0.0	298.00	6.32	6.3	0.0
300.00	5.46	5.5	0.0			300.00	5.42	5.4	0.0	300.00	6.33	6.3	0.0
302.00	5.62	5.5	0.1			302.00	5.43	5.4	0.0	302.00	6.32	6.3	0.0
304.00	5.68	5.6	0.1			304.00	5.46	5.4	0.0	304.00	6.37	6.3	0.0
306.00	5.66	5.6	0.1			306.00	5.47	5.5	0.0	306.00	6.38	6.4	0.0
308.00	5.80	5.6	0.2			308.00	5.51	5.5	0.0	308.00	6.36	6.4	0.0
310.00	5.67	5.6	0.1			310.00	5.53	5.5	0.0	310.00	6.42	6.4	0.0
312.00	5.58	5.6	-0.1			312.00	5.54	5.5	0.0	312.00	6.45	6.4	0.0
314.00	5.66	5.7	0.0			314.00	5.54	5.5	0.0	314.00	6.44	6.4	0.0
316.00	5.75	5.7	0.1			316.00	5.58	5.6	0.0	316.00	6.42	6.5	0.0
318.00	5.55	5.7	-0.1			318.00	5.58	5.6	0.0	318.00	6.51	6.5	0.0
320.00	5.72	5.7	0.0			320.00	5.60	5.6	0.0	320.00	6.51	6.5	0.0
322.00	5.82	5.7	0.1			322.00	5.63	5.6	0.0	322.00	6.53	6.5	0.0
324.00	5.71	5.8	0.0			324.00	5.65	5.6	0.0	324.00	6.50	6.5	0.0
326.00	5.69	5.8	-0.1			326.00	5.66	5.7	0.0	326.00	6.59	6.5	0.0
328.00	5.81	5.8	0.0			328.00	5.70	5.7	0.0	328.00	6.59	6.6	0.0
330.00	5.82	5.8	0.0			330.00	5.72	5.7	0.0	330.00	6.62	6.6	0.0
332.00	5.84	5.8	0.0			332.00	5.73	5.7	0.0	332.00	6.62	6.6	0.0
334.00	5.99	5.9	0.1			334.00	5.78	5.7	0.0	334.00	6.66	6.6	0.0
336.00	5.97	5.9	0.1			336.00	5.78	5.8	0.0	336.00	6.60	6.6	0.0
338.00	5.99	5.9	0.1			338.00	5.79	5.8	0.0	338.00	6.69	6.7	0.0
340.00	5.94	5.9	0.0			340.00	5.80	5.8	0.0	340.00	6.60	6.7	-0.1
342.00	5.83	5.9	-0.1			342.00	5.82	5.8	0.0	342.00	6.73	6.7	0.0

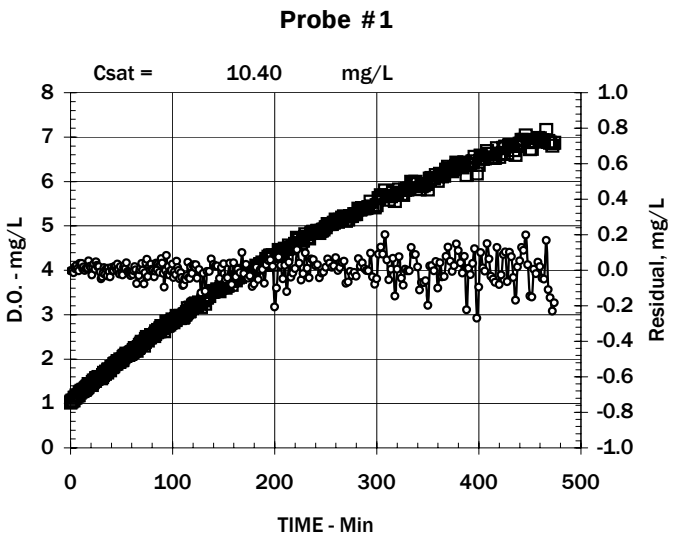
Pt. 1	est.	calc.		Pt. 2	Not Used	Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.02	1.02				C0	1.03	1.03		C0	2.21	2.21	
Kla-in	0.13	0.13				Kla-in	0.13	0.13		Kla-in	0.14	0.14	
C*	10.40	10.40				C*	10.40	10.40		C*	10.40	10.40	
Sq.Diff.	1.2718					Sq.Diff.	0.0391			Sq.Diff.	0.4566		
Time	D.O.	D.O.calc	diff			Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
344.00	5.89	6.0	-0.1			344.00	5.84	5.8	0.0	344.00	6.75	6.7	0.0
346.00	5.91	6.0	-0.1			346.00	5.87	5.9	0.0	346.00	6.72	6.7	0.0
348.00	5.94	6.0	-0.1			348.00	5.88	5.9	0.0	348.00	6.74	6.7	0.0
350.00	5.82	6.0	-0.2			350.00	5.89	5.9	0.0	350.00	6.72	6.8	0.0
352.00	6.06	6.0	0.0			352.00	5.92	5.9	0.0	352.00	6.69	6.8	-0.1
354.00	6.08	6.1	0.0			354.00	5.93	5.9	0.0	354.00	6.82	6.8	0.0
356.00	6.07	6.1	0.0			356.00	5.95	6.0	0.0	356.00	6.85	6.8	0.0
358.00	6.14	6.1	0.0			358.00	5.98	6.0	0.0	358.00	6.84	6.8	0.0
360.00	6.01	6.1	-0.1			360.00	6.01	6.0	0.0	360.00	6.85	6.8	0.0
362.00	6.17	6.1	0.0			362.00	6.02	6.0	0.0	362.00	6.91	6.9	0.1
364.00	6.11	6.1	0.0			364.00	6.03	6.0	0.0	364.00	6.92	6.9	0.0
366.00	6.13	6.2	0.0			366.00	6.05	6.0	0.0	366.00	6.94	6.9	0.0
368.00	6.26	6.2	0.1			368.00	6.07	6.1	0.0	368.00	6.96	6.9	0.1
370.00	6.33	6.2	0.1			370.00	6.09	6.1	0.0	370.00	6.88	6.9	0.0
372.00	6.27	6.2	0.1			372.00	6.12	6.1	0.0	372.00	7.00	6.9	0.1
374.00	6.23	6.2	0.0			374.00	6.12	6.1	0.0	374.00	6.95	7.0	0.0
376.00	6.28	6.3	0.0			376.00	6.16	6.1	0.0	376.00	7.03	7.0	0.1
378.00	6.42	6.3	0.1			378.00	6.18	6.2	0.0	378.00	6.96	7.0	0.0
380.00	6.40	6.3	0.1			380.00	6.18	6.2	0.0	380.00	7.02	7.0	0.0
382.00	6.35	6.3	0.0			382.00	6.20	6.2	0.0	382.00	7.07	7.0	0.0
384.00	6.31	6.3	0.0			384.00	6.21	6.2	0.0	384.00	7.07	7.0	0.0
386.00	6.42	6.3	0.1			386.00	6.25	6.2	0.0	386.00	7.02	7.0	0.0
388.00	6.14	6.4	-0.2			388.00	6.26	6.2	0.0	388.00	7.07	7.1	0.0
390.00	6.39	6.4	0.0			390.00	6.28	6.3	0.0	390.00	7.10	7.1	0.0
392.00	6.37	6.4	0.0			392.00	6.29	6.3	0.0	392.00	7.06	7.1	0.0
394.00	6.45	6.4	0.0			394.00	6.29	6.3	0.0	394.00	7.16	7.1	0.1
396.00	6.55	6.4	0.1			396.00	6.32	6.3	0.0	396.00	7.15	7.1	0.0
398.00	6.18	6.4	-0.3			398.00	6.33	6.3	0.0	398.00	7.16	7.1	0.0
400.00	6.37	6.5	-0.1			400.00	6.34	6.3	0.0	400.00	7.09	7.2	-0.1
402.00	6.58	6.5	0.1			402.00	6.35	6.4	0.0	402.00	7.09	7.2	-0.1
404.00	6.51	6.5	0.0			404.00	6.39	6.4	0.0	404.00	7.13	7.2	-0.1
406.00	6.51	6.5	0.0			406.00	6.41	6.4	0.0	406.00	7.22	7.2	0.0
408.00	6.68	6.5	0.2			408.00	6.41	6.4	0.0	408.00	7.22	7.2	0.0
410.00	6.61	6.6	0.1			410.00	6.44	6.4	0.0	410.00	7.20	7.2	0.0
412.00	6.53	6.6	0.0			412.00	6.44	6.4	0.0	412.00	7.25	7.2	0.0
414.00	6.53	6.6	-0.1			414.00	6.47	6.5	0.0	414.00	7.26	7.3	0.0
416.00	6.53	6.6	-0.1			416.00	6.49	6.5	0.0	416.00	7.25	7.3	0.0
418.00	6.74	6.6	0.1			418.00	6.51	6.5	0.0	418.00	7.31	7.3	0.0
420.00	6.55	6.6	-0.1			420.00	6.52	6.5	0.0	420.00	7.31	7.3	0.0
422.00	6.62	6.6	0.0			422.00	6.53	6.5	0.0	422.00	7.26	7.3	-0.1
424.00	6.75	6.7	0.1			424.00	6.53	6.5	0.0	424.00	7.31	7.3	0.0
426.00	6.79	6.7	0.1			426.00	6.55	6.6	0.0	426.00	7.39	7.3	0.0
428.00	6.63	6.7	-0.1			428.00	6.57	6.6	0.0	428.00	7.31	7.4	-0.1
430.00	6.82	6.7	0.1			430.00	6.58	6.6	0.0	430.00	7.34	7.4	0.0
432.00	6.81	6.7	0.1			432.00	6.61	6.6	0.0	432.00	7.42	7.4	0.0
434.00	6.70	6.7	0.0			434.00	6.63	6.6	0.0	434.00	7.34	7.4	-0.1
436.00	6.59	6.8	-0.2			436.00	6.63	6.6	0.0	436.00	7.48	7.4	0.1
438.00	6.80	6.8	0.0			438.00	6.65	6.7	0.0	438.00	7.36	7.4	-0.1
440.00	6.85	6.8	0.1			440.00	6.66	6.7	0.0	440.00	7.47	7.4	0.0
442.00	6.94	6.8	0.1			442.00	6.69	6.7	0.0	442.00	7.39	7.5	-0.1
444.00	6.94	6.8	0.1			444.00	6.71	6.7	0.0	444.00	7.41	7.5	-0.1
446.00	7.04	6.8	0.2			446.00	6.71	6.7	0.0	446.00	7.56	7.5	0.1
448.00	6.89	6.9	0.0			448.00	6.74	6.7	0.0	448.00	7.54	7.5	0.0
450.00	6.72	6.9	-0.1			450.00	6.76	6.8	0.0	450.00	7.45	7.5	-0.1
452.00	6.73	6.9	-0.2			452.00	6.75	6.8	0.0	452.00	7.59	7.5	0.1
454.00	6.91	6.9	0.0			454.00	6.76	6.8	0.0	454.00	7.60	7.5	0.1
456.00	6.90	6.9	0.0			456.00	6.79	6.8	0.0	456.00	7.49	7.6	-0.1
458.00	6.98	6.9	0.0			458.00	6.80	6.8	0.0	458.00	7.61	7.6	0.0
460.00	6.97	6.9	0.0			460.00	6.82	6.8	0.0	460.00	7.54	7.6	0.0
462.00	6.92	7.0	0.0			462.00	6.84	6.8	0.0	462.00	7.63	7.6	0.0
464.00	6.93	7.0	-0.1			464.00	6.84	6.9	0.0	464.00	7.63	7.6	0.0
466.00	7.16	7.0	0.2			466.00	6.87	6.9	0.0	466.00	7.63	7.6	0.0
468.00	6.90	7.0	-0.1			468.00	6.87	6.9	0.0	468.00	7.54	7.6	-0.1
470.00	6.87	7.0	-0.2			470.00	6.89	6.9	0.0	470.00	7.57	7.6	-0.1
472.00	6.81	7.0	-0.2			472.00	6.89	6.9	0.0	472.00	7.66	7.7	0.0
474.00	6.87	7.1	-0.2			474.00	6.90	6.9	0.0	474.00	7.60	7.7	-0.1

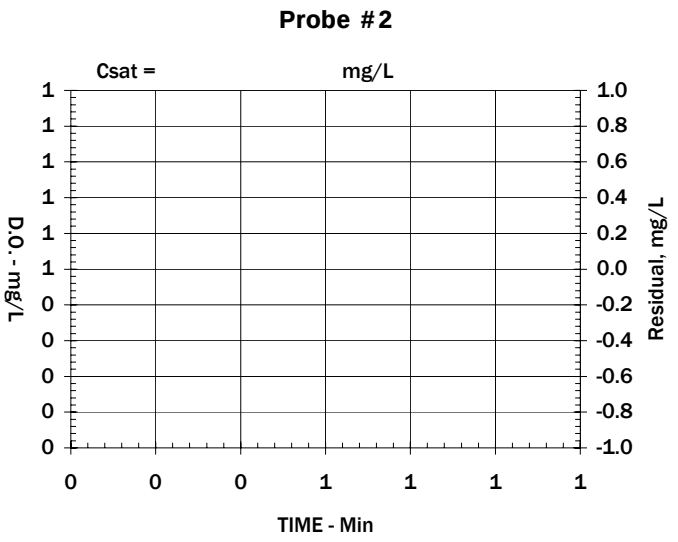
	Probe 1			Probe 2		Probe 3				Probe 4		
Lower	9.80%				Lower	10.04%			Lower	21.30%		
Upper	68.81%				Upper	66.32%			Upper	73.61%		
	Value	Abs.Un.	%LSE			Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE
C*	10.403	0.100	0.965		C*	10.403	0.019	0.181	C*	10.403	0.053	0.511
C0	1.023	0.011	1.030		C0	1.032	0.002	0.178	C0	2.208	0.006	0.288
KLaT	0.130	0.000	1.693		KLaT	0.126	0.000	0.314	KLaT	0.139	0.000	1.054
Error	0.065				Error	0.011			Error	0.039		

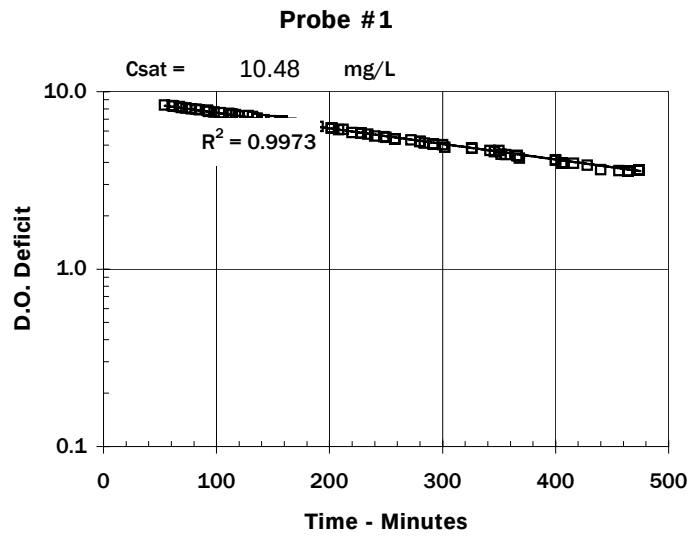
PROJECT: PHi Unit Alone - Pumping
DATE: 11/7/2006
RUN: 1.00

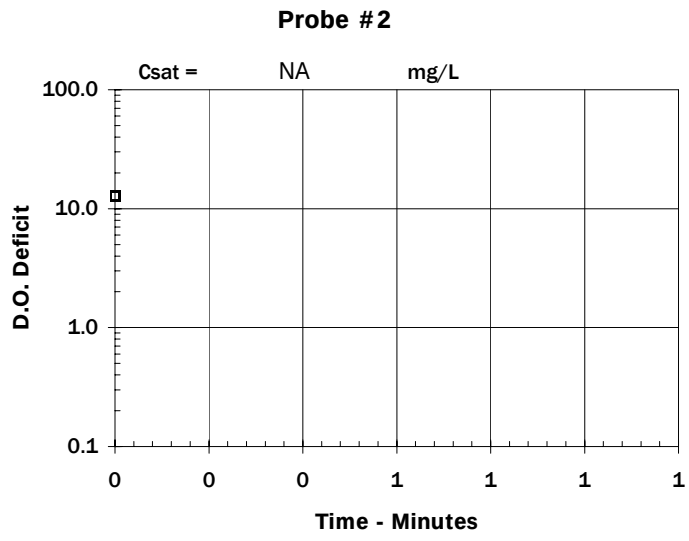




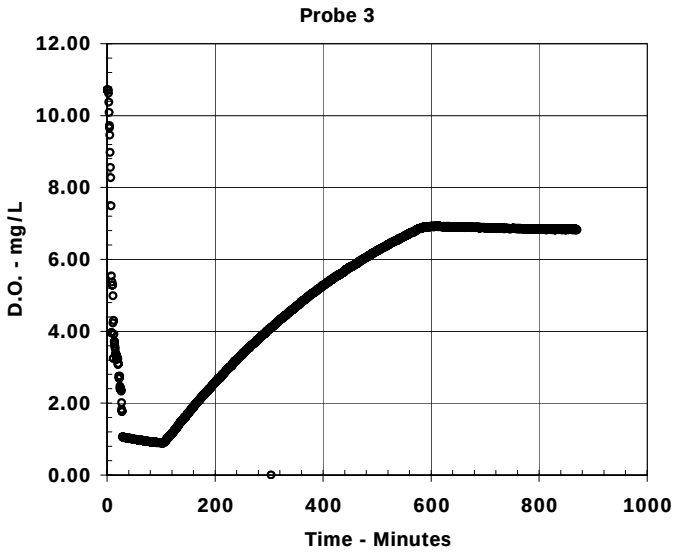


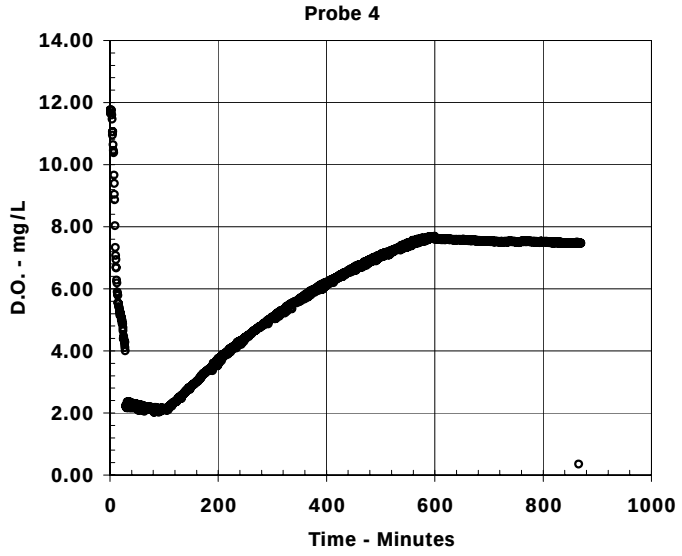


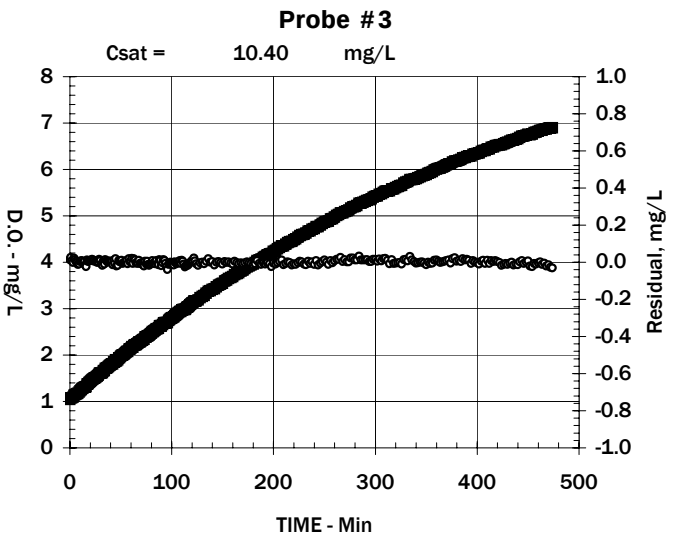


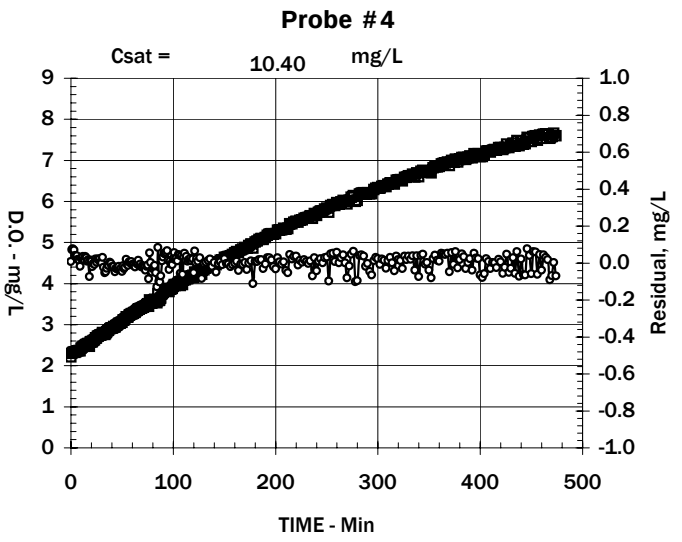


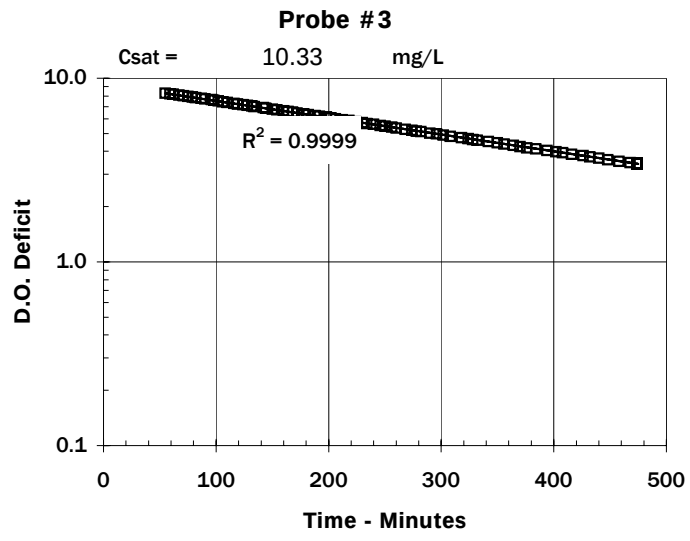
Project: PHi Unit Alone - Pumping
Date: Nov 07, 2006
Run: 1

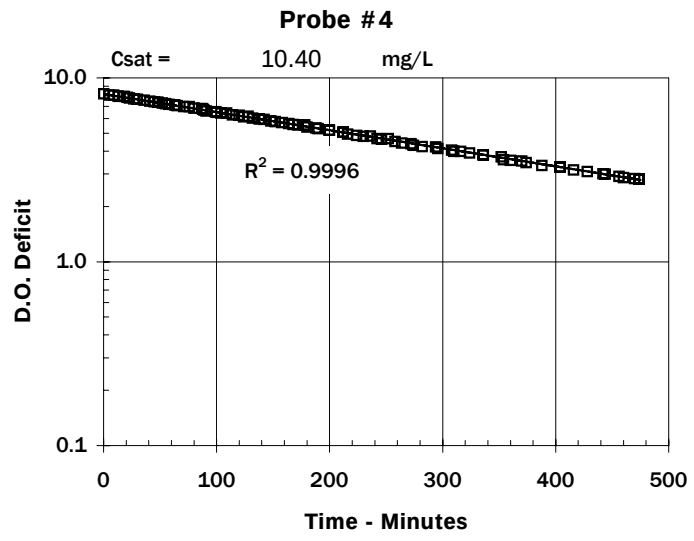












Project: PHi Unit Alone - Pumping
Date: Nov 07, 2006
Run: 1

AIR FLOW RATE DETERMINATION
ANR 73 COMMERCIAL ANNUBAR

PROJECT : PHi Unit Alone - Pumping

SCFM = $C'' \frac{[BP + LP]}{[LT + 460]}$

C' = Fna * k * D^2 * Fra * Fpb * Ftb * Fg * Fpv * Faa * Fl * Fm * Ya

C'' = C' VALUE CORRECTED FOR HUMIDITY

RUN	#		**1**	
DATE			Nov-06	
OPERATING CONDITIONS			AWR-73	
ANNUBAR TYPE			2	
BAROMETRIC PRESSURE	* **BP**		14.18	PSIA
LINE PRESSURE	* **LP**		45.02	PSIG
LINE TEMPERATURE	* **LT**		57	°F
DIFFERENTIAL PRESSURE	* **^H**		0.00	In. H2O
RELATIVE HUMIDITY	* **RH**		68%	%
AMBIENT TEMPERATURE	*	**15.5**	57	°F
PIPE INSIDE DIAMETER	* **D**		4.026	In.
UNITS CONVERSION FACTOR	**Fna**		128.520	
ANNUBAR FLOW COEFFICIENT	**k**		0.746	
SQUARE OF PIPE ID	**D^2**		16.209	
BASE PRESSURE			14.700	PSIA
BASE PRESSURE FACTOR	**Fpb**		1.002	
BASE TEMPERATURE			68.000	°F
BASE TEMPERATURE FACTOR	**Ftb**		1.015	
THERMAL EXPANSION FACTOR	**Faa**		1.001	
MANOMETER LOCATION FACTOR	**Fl**		1.000	
HG MANOMETER CORRECTION FACTOR	**Fm**		1.000	
REYNOLD NUMBER	**Rd**		10,210.3	
FLOWING VICOSITY	**vis**		0.018	cP
REYNOLD NUMBER FACTOR	**Fra**		0.965	
SPECIFIC GRAVITY	**g**		1.000	
SPECIFIC GRAVITY FACTOR	**Fg**		1.000	
SUPERCOMPRESSIBILTY	**Z**		0.998	
SUPERCOMPRESSIBILTY FACTOR	**Fpv**		1.001	
GAS EXPANSION FACTOR	**Ya**		1.000	
SCFM UNCORRECTED FOR HUMIDITY	**SCFM**		25.2	
C'			1,527.21	
VAPOR PRESSURE OF WATER AMB. TEMP.	**VP**		0.231	
ACTUAL CUBIC FEET PER MINUTE	**ACFM**		6.1	69.2
HUMIDITY CORRECTED STANDARD AIR FLOW	**SCFM**		**25.1**	@68°F, 36% RH, 14.7 PSIA
INLET CUBIC FEET PER MINUTE	**ICFM**		**25.5**	
C''			**1,522.09**	

FORMULAS AND FACTORS DERIVED FROM: L.K.Spink; "Principles and Practice of FLOW METER ENGINEERING"; Ninth Ed., Nov 1975; The FOXBORO CO., Foxboro, Mass.
"ORIFICE FLOW METER"; THE BRISTOL COMPANY; Waterbury, Conn.
"ANNUBAR FLOW HANDBOOK"; August 1978; DIETERICH STANDARD CORPORATION; Boulder, Co.

HUMIDITY CORRECTED AIR FLOW DETERMINED per: "ASCE STANDARD Measurement of Oxygen Transfer in Clean Water";ANNEX A; July 1984; American Society of Civil Engineers

GSEE, Inc.

Environmental Services

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: PHi - Membrane Tube Diffusers Only
DATE: 8-Nov-06
RUN: 2

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

	Initial	Mid Point	Final
Barometric Pres. (PSIA)	14.189	14.189	14.189
(mm Hg)	733.80	733.80	733.80
Ambient Temperature (°F)	61.00	61.50	63.00
Relative Humidity (%)	69%	69%	67%
Line Pressure (PSIG)	8.866	8.866	8.866
(In. Hg)	18.05	18.05	18.05
Line Temperature (°F)	124.00	131.00	134.00
ΔH Air Flow Dev. 1 (Annubar)	0.019	0.019	0.019
ΔH Air Flow Dev. 2 (Orifice)	2.450	2.400	2.400
ΔH Air Flow Dev. 3 (Annubar)	NA	NA	NA
ΔH Air Flow Dev. 4 (Annubar)	NA	NA	NA
Water Temp. (°C)	14.60	14.61	14.62
Orifice Diameter (in)		1.349	
Number Of Aeration Devices		28	
Side Water Depth (ft)		19.75	(6.00 m)
Air Release Depth (ft)		18.75	(5.70 m)
Tank Length (ft)		0.00	(0.00 m)
Tank Width (ft)		0.00	(0.00 m)
Tank Diameter (ft)		21.00	(6.38 m)
Gear Reducer or Belt Efficiency		100.0%	
Motor Efficiency		89.0%	
Total HP_{wire} av.		2.76	(2.06 kw)

C' Air Flow Device 1 (Annubar)	1,519.15
Air Flow Device 1 (SCFM)	41.41
C' Air Flow Device 2 (Orifce)	133.92
Air Flow Device 2 (SCFM)	41.16
Average Air Flow (SCFM)	41.28
Effective Depth Correction (f)	0.33
Headloss (In. H_2O)	20.42
C* (mg/l)	11.66
$C_{sm}T$ (Standard Methods, mg/l)	10.17
C^*_{20} Standard Conditions	10.74
Tank Volume (Ft³)	6,840.6
(Gallons)	51,171.4
(m³)	193.7
(Million Pounds)	0.427
$\#Na_2SO_3$ @ 160% Stoichiometric	63
Cobalt Concen. (mg/l)	0.100
Grams Cobalt Chloride	79.9
Total HP_{motor} av.	2.46
TDS (mg/L)	452.00

NON-LINEAR REGRESSION RESULTS

Probe	K_{LaT}	K_{La20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Std. Err.
1	2.13	2.42	11.28	0.40	26.37	4.09	11.79	0.0855
2	2.14	2.43	11.22	0.40	26.23	4.07	11.66	0.0342
3	2.14	2.44	11.34	0.40	26.51	4.11	11.77	0.0240
4	2.15	2.44	11.05	0.39	25.83	4.00	11.43	0.0298
avg.	2.14	2.43	11.22	0.40	26.23	4.07	11.66	0.0434
Avg	*2.14*	*2.43*	*11.28*	*0.40*	*26.36*	*4.09*	*11.72*	Exclude Max&Min
TDS	***2.26***	***2.57***	***11.83***	***0.42***	***27.66***	***4.29***	***11.66***	***1.48%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-WHP		

OXYGEN TRANSFER

Total SCFM:	**41.3**	**66.374**	**:Nm³/Hr**	**19.484**	**L/s**	**#O2/Hr:**	**11.83**	**5.366**	**:KgO2/Hr**
SCFM/Diff.:	**1.47**	**2.371**	**:Nm³/hr/Diff**			**#O2/Hr/Diff.:**	**0.42**	**0.192**	**:KgO2/Hr/Diff.**
SCFM/KCF:	**6.0**	**0.343**	**:Nm³/hr/m³**			**#O2/Day:**	**283.9**	**128.8**	**:KgO2/Day**
Total ICFM:	**48.1**	**22.72**	**L/s**			**#O2/Day/1000 Ft³:**	**42**	**0.66**	**:KgO2/Day/m³**

LINEAR REGRESSION RESULTS

Probe	K_{LaT}	K_{La20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Corr.Coeff.
1	2.17	2.46	11.30	0.40	26.43	4.10	11.61	0.9983
2	2.20	2.50	11.42	0.41	26.71	4.14	11.55	0.9994
3	2.20	2.50	11.54	0.41	26.98	4.18	11.68	0.9999
4	2.13	2.42	10.94	0.39	25.58	3.97	11.43	0.9995
avg.	2.17	2.47	11.30	0.40	26.42	4.10	11.57	0.9993
Avg	*2.18*	*2.48*	*11.35*	*0.41*	*26.55*	*4.12*	*11.58*	Exclude Max&Min
TDS	***2.29***	***2.60***	***11.91***	***0.43***	***27.86***	***4.32***	***11.57***	
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-HPw		

EUROPEAN STANDARD

Probe	K_{LaT}	K_{La10}	SOTR	SOTR/Dev	SAE	C*
1	2.15	1.93	5.09	0.18	2.48	11.79
2	2.17	1.95	5.09	0.18	2.48	11.66
3	2.17	1.96	5.14	0.18	2.50	11.77
4	2.14	1.93	4.92	0.18	2.39	11.43
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
avg.	2.16	1.94	5.06	0.18	2.46	11.66
Avg	*2.16*	*1.94*	*5.09*	*0.18*	*2.48*	*11.72*
TDS	***2.27***	***2.05***	***5.34***	***0.19***	***2.59***	***11.66***
Corrected	/hr	/hr	kg O_2/hr		kg O_2/hr-kw	mg/L

Exclude Max&Min

Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.27	1.27		C0	2.13	2.13		C0	1.80	1.80		C0	3.34	3.34	
Kla-in	2.13	2.13		Kla-in	2.14	2.14		Kla-in	2.14	2.14		Kla-in	2.15	2.15	
C*	11.79	11.79		C*	11.66	11.66		C*	11.77	11.77		C*	11.43	11.43	
Sq.Diff.	2.1730			Sq.Diff.	0.3471			Sq.Diff.	0.1710			Sq.Diff.	0.2643		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	1.14	1.3	-0.1	0.00	2.09	2.1	0.0	0.00	1.75	1.8	-0.1	0.00	3.38	3.3	0.0
0.26	1.31	1.4	0.0	0.26	2.22	2.2	0.0	0.26	1.90	1.9	0.0	0.26	3.45	3.4	0.0
0.53	1.43	1.5	0.0	0.53	2.28	2.3	0.0	0.53	1.98	2.0	0.0	0.53	3.45	3.5	0.0
0.80	1.60	1.6	0.0	0.80	2.42	2.4	0.0	0.80	2.09	2.1	0.0	0.80	3.57	3.6	0.0
1.06	1.59	1.7	-0.1	1.06	2.46	2.5	0.0	1.06	2.18	2.2	0.0	1.06	3.61	3.6	0.0
1.33	1.64	1.8	-0.1	1.33	2.51	2.6	-0.1	1.33	2.19	2.3	-0.1	1.33	3.69	3.7	0.0
1.60	1.78	1.8	-0.1	1.60	2.63	2.7	0.0	1.60	2.35	2.4	0.0	1.60	3.77	3.8	0.0
1.86	1.94	1.9	0.0	1.86	2.75	2.7	0.0	1.86	2.52	2.4	0.1	1.86	3.78	3.9	-0.1
2.13	1.93	2.0	-0.1	2.13	2.80	2.8	0.0	2.13	2.57	2.5	0.0	2.13	3.89	3.9	0.0
2.39	2.00	2.1	-0.1	2.39	2.89	2.9	0.0	2.39	2.65	2.6	0.0	2.39	4.02	4.0	0.0
2.66	2.07	2.2	-0.1	2.66	2.95	3.0	-0.1	2.66	2.71	2.7	0.0	2.66	4.07	4.1	0.0
2.93	2.25	2.3	-0.1	2.93	3.06	3.1	0.0	2.93	2.77	2.8	0.0	2.93	4.15	4.1	0.0
3.20	2.34	2.4	-0.1	3.20	3.152	3.2	0.0	3.20	2.89	2.9	0.0	3.20	4.23	4.2	0.0
3.46	2.52	2.5	0.0	3.46	3.274	3.2	0.0	3.46	3.00	3.0	0.0	3.46	4.29	4.3	0.0
3.73	2.60	2.6	0.0	3.73	3.342	3.3	0.0	3.73	3.08	3.0	0.0	3.73	4.34	4.3	0.0
4.00	2.64	2.7	0.0	4.00	3.399	3.4	0.0	4.00	3.14	3.1	0.0	4.00	4.42	4.4	0.0
4.26	2.67	2.7	-0.1	4.26	3.468	3.5	0.0	4.26	3.23	3.2	0.0	4.26	4.50	4.5	0.0
4.53	2.76	2.8	-0.1	4.53	3.532	3.6	0.0	4.53	3.29	3.3	0.0	4.53	4.54	4.5	0.0
4.79	2.90	2.9	0.0	4.79	3.64	3.6	0.0	4.79	3.36	3.4	0.0	4.79	4.65	4.6	0.0
5.06	2.95	3.0	0.0	5.06	3.68	3.7	0.0	5.06	3.45	3.5	0.0	5.06	4.66	4.7	0.0
5.33	3.07	3.1	0.0	5.33	3.76	3.8	0.0	5.33	3.49	3.5	0.0	5.33	4.72	4.7	0.0
5.59	3.14	3.2	0.0	5.59	3.84	3.9	0.0	5.59	3.56	3.6	0.0	5.59	4.83	4.8	0.0
5.86	3.23	3.2	0.0	5.86	3.92	3.9	0.0	5.86	3.69	3.7	0.0	5.86	4.84	4.9	0.0
6.13	3.39	3.3	0.1	6.13	3.99	4.0	0.0	6.13	3.70	3.8	-0.1	6.13	4.89	4.9	0.0
6.40	3.44	3.4	0.0	6.40	4.08	4.1	0.0	6.40	3.83	3.8	0.0	6.40	4.97	5.0	0.0
6.66	3.54	3.5	0.1	6.66	4.17	4.2	0.0	6.66	3.91	3.9	0.0	6.66	5.06	5.1	0.0
6.93	3.61	3.6	0.0	6.93	4.24	4.2	0.0	6.93	3.99	4.0	0.0	6.93	5.12	5.1	0.0
7.20	3.64	3.6	0.0	7.20	4.27	4.3	0.0	7.20	4.04	4.1	0.0	7.20	5.14	5.2	0.0
7.46	3.68	3.7	0.0	7.46	4.31	4.4	-0.1	7.46	4.04	4.1	-0.1	7.46	5.21	5.2	0.0
7.73	3.85	3.8	0.1	7.73	4.44	4.4	0.0	7.73	4.20	4.2	0.0	7.73	5.28	5.3	0.0
8.00	3.89	3.9	0.0	8.00	4.49	4.5	0.0	8.00	4.24	4.3	0.0	8.00	5.34	5.4	0.0
8.26	4.00	3.9	0.1	8.26	4.56	4.6	0.0	8.26	4.29	4.4	-0.1	8.26	5.40	5.4	0.0
8.53	4.07	4.0	0.1	8.53	4.66	4.6	0.0	8.53	4.42	4.4	0.0	8.53	5.50	5.5	0.0
8.80	4.21	4.1	0.1	8.80	4.75	4.7	0.0	8.80	4.46	4.5	0.0	8.80	5.56	5.5	0.0
9.06	4.16	4.2	0.0	9.06	4.77	4.8	0.0	9.06	4.56	4.6	0.0	9.06	5.58	5.6	0.0
9.33	4.32	4.2	0.1	9.33	4.88	4.8	0.1	9.33	4.68	4.6	0.1	9.33	5.65	5.6	0.0
9.59	4.39	4.3	0.1	9.59	4.92	4.9	0.0	9.59	4.67	4.7	0.0	9.59	5.71	5.7	0.0
9.86	4.43	4.4	0.1	9.86	4.97	5.0	0.0	9.86	4.76	4.8	0.0	9.86	5.72	5.7	0.0
10.13	4.49	4.4	0.0	10.13	5.02	5.0	0.0	10.13	4.81	4.8	0.0	10.13	5.78	5.8	0.0
10.40	4.53	4.5	0.0	10.40	5.11	5.1	0.0	10.40	4.96	4.9	0.1	10.40	5.85	5.9	0.0
10.66	4.60	4.6	0.0	10.66	5.16	5.1	0.0	10.66	4.97	5.0	0.0	10.66	5.90	5.9	0.0
10.93	4.61	4.6	0.0	10.93	5.21	5.2	0.0	10.93	5.07	5.0	0.0	10.93	5.96	6.0	0.0
11.19	4.76	4.7	0.0	11.19	5.30	5.3	0.0	11.19	5.12	5.1	0.0	11.19	6.03	6.0	0.0
11.46	4.82	4.8	0.0	11.46	5.33	5.3	0.0	11.46	5.15	5.2	0.0	11.46	6.02	6.1	0.0
11.73	4.86	4.8	0.0	11.73	5.39	5.4	0.0	11.73	5.18	5.2	0.0	11.73	6.13	6.1	0.0
12.00	5.06	4.9	0.1	12.00	5.52	5.5	0.1	12.00	5.29	5.3	0.0	12.00	6.20	6.2	0.0
12.26	5.07	5.0	0.1	12.26	5.55	5.5	0.0	12.26	5.36	5.3	0.0	12.26	6.22	6.2	0.0
12.53	5.09	5.0	0.1	12.53	5.58	5.6	0.0	12.53	5.39	5.4	0.0	12.53	6.27	6.3	0.0
12.80	5.12	5.1	0.0	12.80	5.65	5.6	0.0	12.80	5.49	5.5	0.0	12.80	6.35	6.3	0.0
13.06	5.20	5.2	0.0	13.06	5.72	5.7	0.0	13.06	5.56	5.5	0.0	13.06	6.41	6.4	0.0
13.33	5.28	5.2	0.0	13.33	5.77	5.7	0.0	13.33	5.58	5.6	0.0	13.33	6.46	6.4	0.1
13.59	5.25	5.3	0.0	13.59	5.79	5.8	0.0	13.59	5.63	5.6	0.0	13.59	6.50	6.5	0.0
13.86	5.36	5.4	0.0	13.86	5.85	5.9	0.0	13.86	5.69	5.7	0.0	13.86	6.52	6.5	0.0
14.13	5.41	5.4	0.0	14.13	5.92	5.9	0.0	14.13	5.80	5.8	0.0	14.13	6.55	6.6	0.0
14.40	5.42	5.5	-0.1	14.40	5.94	6.0	0.0	14.40	5.84	5.8	0.0	14.40	6.57	6.6	0.0
14.66	5.55	5.5	0.0	14.66	6.04	6.0	0.0	14.66	5.90	5.9	0.0	14.66	6.67	6.6	0.0
14.93	5.55	5.6	0.0	14.93	6.06	6.1	0.0	14.93	5.96	5.9	0.0	14.93	6.68	6.7	0.0
15.19	5.74	5.7	0.1	15.19	6.14	6.1	0.0	15.19	5.95	6.0	0.0	15.19	6.74	6.7	0.0
15.46	5.69	5.7	0.0	15.46	6.19	6.2	0.0	15.46	6.08	6.0	0.0	15.46	6.79	6.8	0.0
15.73	5.73	5.8	0.0	15.73	6.23	6.2	0.0	15.73	6.10	6.1	0.0	15.73	6.85	6.8	0.0
16.00	5.87	5.8	0.0	16.00	6.30	6.3	0.0	16.00	6.17	6.1	0.0	16.00	6.85	6.9	0.0
16.26	5.82	5.9	-0.1	16.26	6.30	6.3	0.0	16.26	6.21	6.2	0.0	16.26	6.87	6.9	0.0
16.53	5.93	5.9	0.0	16.53	6.39	6.4	0.0	16.53	6.27	6.2	0.0	16.53	6.97	7.0	0.0
16.80	5.95	6.0	0.0	16.80	6.44	6.4	0.0	16.80	6.34	6.3	0.0	16.80	7.02	7.0	0.0
17.06	6.09	6.0	0.0	17.06	6.51	6.5	0.0	17.06	6.38	6.4	0.0	17.06	7.07	7.0	0.0
17.33	6.11	6.1	0.0	17.33	6.54	6.5	0.0	17.33	6.39	6.4	0.0	17.33	7.10	7.1	0.0
17.60	6.11	6.2	0.0	17.60	6.56	6.6	0.0	17.60	6.44	6.5	0.0	17.60	7.14	7.1	0.0
17.86	6.23	6.2	0.0	17.86	6.65	6.6	0.0	17.86	6.52	6.5	0.0	17.86	7.19	7.2	0.0
18.13	6.28	6.3	0.0	18.13	6.69	6.7	0.0	18.13	6.58	6.6	0.0	18.13	7.21	7.2	0.0
18.39	6.36	6.3	0.1	18.39	6.75	6.7	0.0	18.39	6.62	6.6	0.0	18.39	7.26	7.2	0.0
18.66	6.29	6.4	-0.1	18.66	6.75	6.8	0.0	18.66	6.65	6.7	0.0	18.66	7.31	7.3	0.0
18.93	6.35	6.4	-0.1	18.93	6.80	6.8	0.0	18.93	6.70	6.7	0.0	18.93	7.34	7.3	0.0
19.19	6.51	6.5	0.0	19.19	6.86	6.9	0.0	19.19	6.74	6.8	0.0	19.19	7.34	7.4	0.0
19.46	6.66	6.5	0.1	19.46	6.95	6.9	0.0	19.46	6.78	6.8	0.0	19.46	7.42	7.4	0.0
19.73	6.63	6.6	0.1	19.73	6.98	7.0	0.0	19.73	6.84	6.8	0.0	19.73	7.46	7.4	0.0
20.00	6.62	6.6	0.0	20.00	6.99	7.0	0.0	20.00	6.87	6.9	0.0	20.00	7.48	7.5	0.0
20.26	6.70	6.7	0.0	20.26	7.05	7.0	0.0	20.26	6.92	6.9	0.0	20.26	7.54	7.5	0.0
20.53	6.75	6.7	0.0	20.53	7.10	7.1	0.0	20.53	6.98	7.0	0.0	20.53	7.57	7.6	0.0

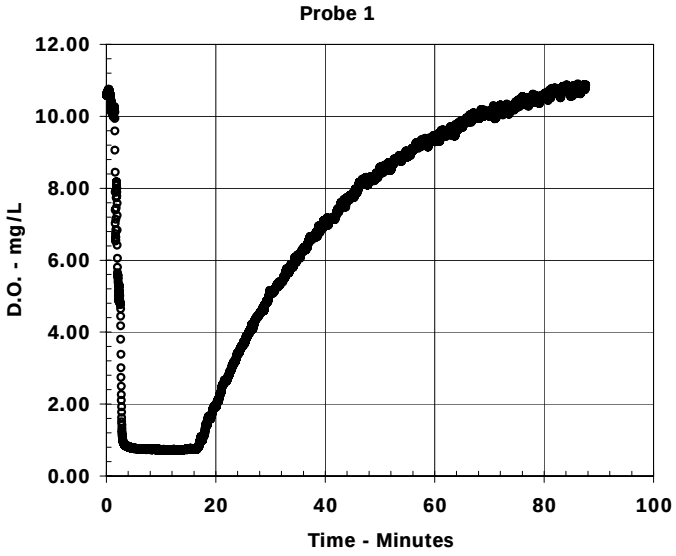
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.27	1.27		C0	2.13	2.13		C0	1.80	1.80		C0	3.34	3.34	
Kla-in	2.13	2.13		Kla-in	2.14	2.14		Kla-in	2.14	2.14		Kla-in	2.15	2.15	
C*	11.79	11.79		C*	11.66	11.66		C*	11.77	11.77		C*	11.43	11.43	
Sq.Diff.	2.1730			Sq.Diff.	0.3471			Sq.Diff.	0.1710			Sq.Diff.	0.2643		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
20.80	6.67	6.8	-0.1	20.80	7.11	7.1	0.0	20.80	7.03	7.0	0.0	20.80	7.62	7.6	0.0
21.06	6.92	6.8	0.1	21.06	7.22	7.2	0.0	21.06	7.09	7.1	0.0	21.06	7.64	7.6	0.0
21.33	6.84	6.9	0.0	21.33	7.19	7.2	0.0	21.33	7.10	7.1	0.0	21.33	7.64	7.7	0.0
21.60	6.90	6.9	0.0	21.60	7.24	7.3	0.0	21.60	7.13	7.2	0.0	21.60	7.69	7.7	0.0
21.86	7.06	6.9	0.1	21.86	7.33	7.3	0.0	21.86	7.19	7.2	0.0	21.86	7.74	7.7	0.0
22.13	7.05	7.0	0.1	22.13	7.35	7.3	0.0	22.13	7.24	7.3	0.0	22.13	7.77	7.8	0.0
22.39	7.10	7.0	0.1	22.39	7.38	7.4	0.0	22.39	7.30	7.3	0.0	22.39	7.74	7.8	-0.1
22.66	7.15	7.1	0.1	22.66	7.41	7.4	0.0	22.66	7.29	7.3	-0.1	22.66	7.80	7.8	0.0
22.93	7.14	7.1	0.0	22.93	7.46	7.5	0.0	22.93	7.39	7.4	0.0	22.93	7.86	7.9	0.0
23.19	7.14	7.2	0.0	23.19	7.49	7.5	0.0	23.19	7.40	7.4	0.0	23.19	7.93	7.9	0.0
23.46	7.17	7.2	0.0	23.46	7.50	7.5	0.0	23.46	7.42	7.5	0.0	23.46	7.91	7.9	0.0
23.73	7.16	7.3	-0.1	23.73	7.53	7.6	-0.1	23.73	7.45	7.5	-0.1	23.73	7.97	8.0	0.0
24.00	7.15	7.3	-0.2	24.00	7.57	7.6	0.0	24.00	7.53	7.5	0.0	24.00	8.04	8.0	0.0
24.26	7.30	7.3	0.0	24.26	7.64	7.7	0.0	24.26	7.56	7.6	0.0	24.26	8.07	8.0	0.0
24.53	7.40	7.4	0.0	24.53	7.71	7.7	0.0	24.53	7.63	7.6	0.0	24.53	8.10	8.1	0.0
24.80	7.43	7.4	0.0	24.80	7.72	7.7	0.0	24.80	7.65	7.7	0.0	24.80	8.08	8.1	0.0
25.06	7.55	7.5	0.1	25.06	7.79	7.8	0.0	25.06	7.69	7.7	0.0	25.06	8.13	8.1	0.0
25.33	7.57	7.5	0.1	25.33	7.83	7.8	0.0	25.33	7.75	7.7	0.0	25.33	8.15	8.2	0.0
25.60	7.65	7.5	0.1	25.60	7.89	7.8	0.0	25.60	7.83	7.8	0.1	25.60	8.18	8.2	0.0
25.86	7.56	7.6	0.0	25.86	7.88	7.9	0.0	25.86	7.82	7.8	0.0	25.86	8.26	8.2	0.0
26.13	7.72	7.6	0.1	26.13	7.95	7.9	0.0	26.13	7.85	7.9	0.0	26.13	8.28	8.3	0.0
26.39	7.69	7.7	0.0	26.39	7.97	7.9	0.0	26.39	7.96	7.9	0.1	26.39	8.28	8.3	0.0
26.66	7.67	7.7	0.0	26.66	7.99	8.0	0.0	26.66	7.97	7.9	0.0	26.66	8.32	8.3	0.0
26.93	7.80	7.7	0.1	26.93	8.05	8.0	0.0	26.93	7.99	8.0	0.0	26.93	8.35	8.3	0.0
27.19	7.80	7.8	0.0	27.19	8.05	8.1	0.0	27.19	7.99	8.0	0.0	27.19	8.36	8.4	0.0
27.46	7.75	7.8	-0.1	27.46	8.06	8.1	0.0	27.46	8.02	8.0	0.0	27.46	8.42	8.4	0.0
27.73	7.97	7.9	0.1	27.73	8.18	8.1	0.1	27.73	8.06	8.1	0.0	27.73	8.51	8.4	0.1
28.00	7.89	7.9	0.0	28.00	8.20	8.2	0.0	28.00	8.20	8.1	0.1	28.00	8.51	8.5	0.0
28.26	7.99	7.9	0.1	28.26	8.22	8.2	0.0	28.26	8.16	8.1	0.0	28.26	8.50	8.5	0.0
28.53	8.11	8.0	0.1	28.53	8.27	8.2	0.1	28.53	8.19	8.2	0.0	28.53	8.52	8.5	0.0
28.80	8.18	8.0	0.2	28.80	8.31	8.3	0.1	28.80	8.23	8.2	0.0	28.80	8.53	8.5	0.0
29.06	8.19	8.0	0.2	29.06	8.34	8.3	0.1	29.06	8.27	8.2	0.0	29.06	8.58	8.6	0.0
29.33	8.20	8.1	0.1	29.33	8.37	8.3	0.1	29.33	8.28	8.3	0.0	29.33	8.63	8.6	0.0
29.60	8.28	8.1	0.2	29.60	8.43	8.3	0.1	29.60	8.34	8.3	0.0	29.60	8.67	8.6	0.0
29.86	8.16	8.1	0.0	29.86	8.42	8.4	0.0	29.86	8.42	8.3	0.1	29.86	8.69	8.7	0.0
30.13	8.23	8.2	0.1	30.13	8.45	8.4	0.0	30.13	8.42	8.4	0.0	30.13	8.69	8.7	0.0
30.39	8.29	8.2	0.1	30.39	8.48	8.4	0.0	30.39	8.42	8.4	0.0	30.39	8.75	8.7	0.0
30.66	8.22	8.2	0.0	30.66	8.48	8.5	0.0	30.66	8.46	8.4	0.0	30.66	8.77	8.7	0.0
30.93	8.29	8.3	0.0	30.93	8.53	8.5	0.0	30.93	8.50	8.5	0.0	30.93	8.80	8.8	0.0
31.19	8.28	8.3	0.0	31.19	8.54	8.5	0.0	31.19	8.51	8.5	0.0	31.19	8.83	8.8	0.0
31.46	8.28	8.3	-0.1	31.46	8.55	8.6	0.0	31.46	8.54	8.5	0.0	31.46	8.84	8.8	0.0
31.73	8.29	8.4	-0.1	31.73	8.58	8.6	0.0	31.73	8.59	8.6	0.0	31.73	8.85	8.8	0.0
32.00	8.44	8.4	0.0	32.00	8.65	8.6	0.0	32.00	8.61	8.6	0.0	32.00	8.90	8.9	0.0
32.26	8.56	8.4	0.1	32.26	8.69	8.6	0.0	32.26	8.63	8.6	0.0	32.26	8.87	8.9	0.0
32.53	8.59	8.5	0.1	32.53	8.74	8.7	0.1	32.53	8.69	8.7	0.0	32.53	8.93	8.9	0.0
32.79	8.58	8.5	0.1	32.79	8.75	8.7	0.0	32.79	8.69	8.7	0.0	32.79	8.98	8.9	0.0
33.06	8.62	8.5	0.1	33.06	8.77	8.7	0.0	33.06	8.70	8.7	0.0	33.06	8.98	9.0	0.0
33.33	8.54	8.6	0.0	33.33	8.75	8.8	0.0	33.33	8.76	8.7	0.0	33.33	8.96	9.0	0.0
33.60	8.59	8.6	0.0	33.60	8.80	8.8	0.0	33.60	8.79	8.8	0.0	33.60	9.03	9.0	0.0
33.86	8.66	8.6	0.0	33.86	8.83	8.8	0.0	33.86	8.80	8.8	0.0	33.86	9.04	9.0	0.0
34.13	8.50	8.7	-0.2	34.13	8.81	8.8	0.0	34.13	8.82	8.8	0.0	34.13	9.11	9.1	0.1
34.39	8.68	8.7	0.0	34.39	8.88	8.9	0.0	34.39	8.85	8.9	0.0	34.39	9.11	9.1	0.0
34.66	8.68	8.7	0.0	34.66	8.90	8.9	0.0	34.66	8.88	8.9	0.0	34.66	9.12	9.1	0.0
34.93	8.78	8.7	0.0	34.93	8.95	8.9	0.0	34.93	8.92	8.9	0.0	34.93	9.14	9.1	0.0
35.20	8.75	8.8	0.0	35.20	8.96	8.9	0.0	35.20	8.95	8.9	0.0	35.20	9.18	9.1	0.0
35.46	8.80	8.8	0.0	35.46	8.99	9.0	0.0	35.46	8.94	9.0	0.0	35.46	9.22	9.2	0.1
35.73	8.87	8.8	0.0	35.73	9.02	9.0	0.0	35.73	8.96	9.0	0.0	35.73	9.22	9.2	0.0
36.00	8.82	8.9	0.0	36.00	8.99	9.0	0.0	36.00	8.99	9.0	0.0	36.00	9.18	9.2	0.0
36.26	8.83	8.9	-0.1	36.26	9.04	9.1	0.0	36.26	9.06	9.0	0.0	36.26	9.23	9.2	0.0
36.53	8.88	8.9	0.0	36.53	9.08	9.1	0.0	36.53	9.09	9.1	0.0	36.53	9.26	9.2	0.0
36.79	8.86	8.9	-0.1	36.79	9.09	9.1	0.0	36.79	9.10	9.1	0.0	36.79	9.30	9.3	0.0
37.06	8.96	9.0	0.0	37.06	9.12	9.1	0.0	37.06	9.14	9.1	0.0	37.06	9.26	9.3	0.0
37.33	8.93	9.0	-0.1	37.33	9.11	9.1	0.0	37.33	9.14	9.1	0.0	37.33	9.27	9.3	0.0
37.60	8.95	9.0	-0.1	37.60	9.14	9.2	0.0	37.60	9.17	9.2	0.0	37.60	9.31	9.3	0.0
37.86	8.95	9.0	-0.1	37.86	9.18	9.2	0.0	37.86	9.22	9.2	0.0	37.86	9.36	9.3	0.0
38.13	9.09	9.1	0.0	38.13	9.23	9.2	0.0	38.13	9.23	9.2	0.0	38.13	9.36	9.4	0.0
38.39	9.08	9.1	0.0	38.39	9.24	9.2	0.0	38.39	9.22	9.2	0.0	38.39	9.42	9.4	0.0
38.66	9.16	9.1	0.0	38.66	9.26	9.3	0.0	38.66	9.23	9.3	0.0	38.66	9.41	9.4	0.0
38.93	9.20	9.1	0.1	38.93	9.29	9.3	0.0	38.93	9.27	9.3	0.0	38.93	9.39	9.4	0.0
39.20	9.16	9.2	0.0	39.20	9.28	9.3	0.0	39.20	9.31	9.3	0.0	39.20	9.39	9.4	-0.1
39.46	9.26	9.2	0.1	39.46	9.35	9.3	0.0	39.46	9.33	9.3	0.0	39.46	9.47	9.5	0.0
39.73	9.20	9.2	0.0	39.73	9.33	9.4	0.0	39.73	9.36	9.4	0.0	39.73	9.43	9.5	-0.1
40.00	9.20	9.2	0.0	40.00	9.34	9.4	0.0	40.00	9.41	9.4	0.0	40.00	9.41	9.5	-0.1
40.26	9.32	9.3	0.1	40.26	9.37	9.4	0.0	40.26	9.40	9.4	0.0	40.26	9.39	9.5	-0.1
40.53	9.36	9.3	0.1	40.53	9.42	9.4	0.0	40.53	9.41	9.4	0.0	40.53	9.50	9.5	0.0
40.79	9.32	9.3	0.0	40.79	9.44	9.4	0.0	40.79	9.44	9.5	0.0	40.79	9.55	9.6	0.0
41.06	9.20	9.3	-0.1	41.06	9.41	9.5	0.0	41.06	9.48	9.5	0.0	41.06	9.56	9.6	0.0
41.33	9.38	9.4	0.0	41.33	9.49	9.5	0.0	41.33	9.51	9.5	0.0	41.33	9.59	9.6	0.0

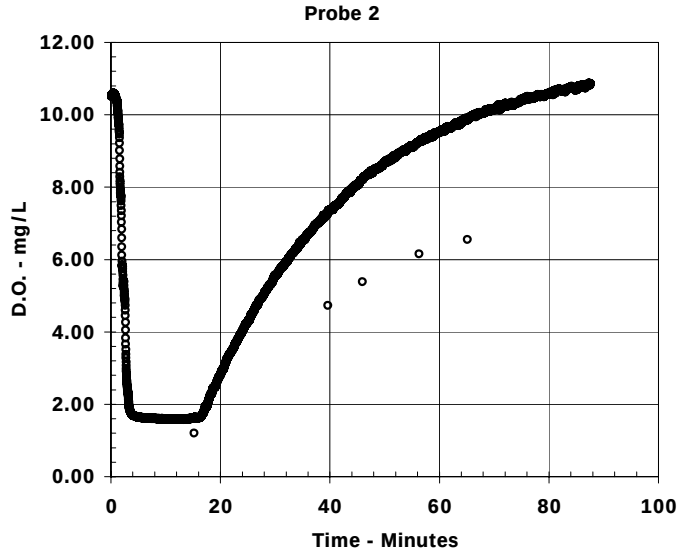
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.27	1.27		C0	2.13	2.13		C0	1.80	1.80		C0	3.34	3.34	
Kla-in	2.13	2.13		Kla-in	2.14	2.14		Kla-in	2.14	2.14		Kla-in	2.15	2.15	
C*	11.79	11.79		C*	11.66	11.66		C*	11.77	11.77		C*	11.43	11.43	
Sq.Diff.	2.1730			Sq.Diff.	0.3471			Sq.Diff.	0.1710			Sq.Diff.	0.2643		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
41.60	9.38	9.4	0.0	41.60	9.50	9.5	0.0	41.60	9.54	9.5	0.0	41.60	9.58	9.6	0.0
41.86	9.39	9.4	0.0	41.86	9.49	9.5	0.0	41.86	9.55	9.5	0.0	41.86	9.55	9.6	-0.1
42.13	9.39	9.4	0.0	42.13	9.52	9.5	0.0	42.13	9.56	9.6	0.0	42.13	9.63	9.6	0.0
42.39	9.35	9.5	-0.1	42.39	9.54	9.6	0.0	42.39	9.58	9.6	0.0	42.39	9.67	9.7	0.0
42.66	9.38	9.5	-0.1	42.66	9.55	9.6	0.0	42.66	9.58	9.6	0.0	42.66	9.71	9.7	0.0
42.93	9.51	9.5	0.0	42.93	9.59	9.6	0.0	42.93	9.63	9.6	0.0	42.93	9.63	9.7	-0.1
43.20	9.36	9.5	-0.2	43.20	9.56	9.6	-0.1	43.20	9.63	9.6	0.0	43.20	9.70	9.7	0.0
43.46	9.57	9.5	0.0	43.46	9.63	9.6	0.0	43.46	9.64	9.7	0.0	43.46	9.67	9.7	-0.1
43.73	9.62	9.6	0.1	43.73	9.68	9.7	0.0	43.73	9.68	9.7	0.0	43.73	9.73	9.7	0.0
44.00	9.49	9.6	-0.1	44.00	9.64	9.7	0.0	44.00	9.68	9.7	0.0	44.00	9.75	9.8	0.0
44.26	9.52	9.6	-0.1	44.26	9.66	9.7	0.0	44.26	9.71	9.7	0.0	44.26	9.75	9.8	0.0
44.53	9.59	9.6	0.0	44.53	9.68	9.7	0.0	44.53	9.70	9.7	0.0	44.53	9.74	9.8	-0.1
44.79	9.62	9.6	0.0	44.79	9.72	9.7	0.0	44.79	9.75	9.8	0.0	44.79	9.79	9.8	0.0
45.06	9.65	9.7	0.0	45.06	9.74	9.8	0.0	45.06	9.76	9.8	0.0	45.06	9.82	9.8	0.0
45.33	9.62	9.7	-0.1	45.33	9.75	9.8	0.0	45.33	9.80	9.8	0.0	45.33	9.84	9.8	0.0
45.60	9.57	9.7	-0.1	45.60	9.75	9.8	0.0	45.60	9.82	9.8	0.0	45.60	9.87	9.9	0.0
45.86	9.46	9.7	-0.3	45.86	9.71	9.8	-0.1	45.86	9.82	9.8	0.0	45.86	9.87	9.9	0.0
46.13	9.73	9.7	0.0	46.13	9.81	9.8	0.0	46.13	9.85	9.9	0.0	46.13	9.85	9.9	0.0
46.39	9.63	9.8	-0.1	46.39	9.79	9.8	-0.1	46.39	9.85	9.9	0.0	46.39	9.88	9.9	0.0
46.66	9.82	9.8	0.0	46.66	9.87	9.9	0.0	46.66	9.88	9.9	0.0	46.66	9.92	9.9	0.0
46.93	9.80	9.8	0.0	46.93	9.87	9.9	0.0	46.93	9.89	9.9	0.0	46.93	9.92	9.9	0.0
47.20	9.71	9.8	-0.1	47.20	9.84	9.9	-0.1	47.20	9.91	9.9	0.0	47.20	9.90	9.9	0.0
47.46	9.81	9.8	0.0	47.46	9.89	9.9	0.0	47.46	9.95	9.9	0.0	47.46	9.92	10.0	0.0
47.73	9.88	9.9	0.0	47.73	9.93	9.9	0.0	47.73	9.95	10.0	0.0	47.73	9.96	10.0	0.0
48.00	9.89	9.9	0.0	48.00	9.95	9.9	0.0	48.00	9.98	10.0	0.0	48.00	9.98	10.0	0.0
48.26	9.96	9.9	0.1	48.26	9.98	10.0	0.0	48.26	9.98	10.0	0.0	48.26	9.99	10.0	0.0
48.53	9.92	9.9	0.0	48.53	9.98	10.0	0.0	48.53	10.01	10.0	0.0	48.53	10.00	10.0	0.0
48.79	9.97	9.9	0.0	48.79	9.99	10.0	0.0	48.79	10.01	10.0	0.0	48.79	9.99	10.0	0.0
49.06	10.05	9.9	0.1	49.06	10.02	10.0	0.0	49.06	10.03	10.0	0.0	49.06	9.99	10.0	0.0
49.33	10.08	10.0	0.1	49.33	10.05	10.0	0.0	49.33	10.05	10.1	0.0	49.33	10.03	10.1	0.0
49.60	10.05	10.0	0.1	49.60	10.06	10.0	0.0	49.60	10.07	10.1	0.0	49.60	10.06	10.1	0.0
49.86	10.00	10.0	0.0	49.86	10.06	10.1	0.0	49.86	10.09	10.1	0.0	49.86	10.07	10.1	0.0
50.13	10.03	10.0	0.0	50.13	10.06	10.1	0.0	50.13	10.08	10.1	0.0	50.13	10.06	10.1	0.0
50.39	9.93	10.0	-0.1	50.39	10.05	10.1	0.0	50.39	10.13	10.1	0.0	50.39	10.08	10.1	0.0
50.66	10.14	10.0	0.1	50.66	10.12	10.1	0.0	50.66	10.12	10.1	0.0	50.66	10.11	10.1	0.0
50.93	10.12	10.1	0.1	50.93	10.12	10.1	0.0	50.93	10.15	10.2	0.0	50.93	10.09	10.1	0.0
51.20	10.07	10.1	0.0	51.20	10.12	10.1	0.0	51.20	10.16	10.2	0.0	51.20	10.13	10.1	0.0
51.46	10.13	10.1	0.0	51.46	10.13	10.1	0.0	51.46	10.17	10.2	0.0	51.46	10.09	10.2	-0.1
51.73	10.06	10.1	-0.1	51.73	10.14	10.2	0.0	51.73	10.20	10.2	0.0	51.73	10.15	10.2	0.0
52.00	10.06	10.1	-0.1	52.00	10.16	10.2	0.0	52.00	10.23	10.2	0.0	52.00	10.20	10.2	0.0
52.26	10.03	10.1	-0.1	52.26	10.14	10.2	0.0	52.26	10.23	10.2	0.0	52.26	10.17	10.2	0.0
52.53	10.17	10.2	0.0	52.53	10.20	10.2	0.0	52.53	10.22	10.2	0.0	52.53	10.20	10.2	0.0
52.79	10.16	10.2	0.0	52.79	10.22	10.2	0.0	52.79	10.28	10.3	0.0	52.79	10.23	10.2	0.0
53.06	10.22	10.2	0.0	53.06	10.25	10.2	0.0	53.06	10.29	10.3	0.0	53.06	10.25	10.2	0.0
53.33	9.96	10.2	-0.2	53.33	10.17	10.2	-0.1	53.33	10.29	10.3	0.0	53.33	10.25	10.2	0.0
53.60	10.23	10.2	0.0	53.60	10.26	10.3	0.0	53.60	10.29	10.3	0.0	53.60	10.27	10.2	0.0
53.86	10.20	10.2	0.0	53.86	10.24	10.3	0.0	53.86	10.30	10.3	0.0	53.86	10.22	10.3	0.0
54.13	10.27	10.2	0.0	54.13	10.29	10.3	0.0	54.13	10.33	10.3	0.0	54.13	10.27	10.3	0.0
54.39	10.29	10.3	0.0	54.39	10.31	10.3	0.0	54.39	10.35	10.3	0.0	54.39	10.30	10.3	0.0
54.66	10.05	10.3	-0.2	54.66	10.24	10.3	-0.1	54.66	10.37	10.4	0.0	54.66	10.30	10.3	0.0
54.93	10.21	10.3	-0.1	54.93	10.29	10.3	0.0	54.93	10.36	10.4	0.0	54.93	10.30	10.3	0.0
55.20	10.16	10.3	-0.1	55.20	10.29	10.3	0.0	55.20	10.39	10.4	0.0	55.20	10.31	10.3	0.0
55.46	10.28	10.3	0.0	55.46	10.32	10.3	0.0	55.46	10.38	10.4	0.0	55.46	10.30	10.3	0.0
55.73	10.07	10.3	-0.3	55.73	10.26	10.4	-0.1	55.73	10.39	10.4	0.0	55.73	10.32	10.3	0.0
56.00	10.16	10.3	-0.2	56.00	10.30	10.4	-0.1	56.00	10.40	10.4	0.0	56.00	10.32	10.3	0.0
56.26	10.20	10.4	-0.2	56.26	10.32	10.4	-0.1	56.26	10.44	10.4	0.0	56.26	10.33	10.4	0.0
56.53	10.28	10.4	-0.1	56.53	10.35	10.4	0.0	56.53	10.46	10.4	0.0	56.53	10.31	10.4	-0.1
56.79	10.28	10.4	-0.1	56.79	10.37	10.4	0.0	56.79	10.45	10.5	0.0	56.79	10.39	10.4	0.0
57.06	10.36	10.4	0.0	57.06	10.41	10.4	0.0	57.06	10.47	10.5	0.0	57.06	10.41	10.4	0.0
57.33	10.31	10.4	-0.1	57.33	10.41	10.4	0.0	57.33	10.48	10.5	0.0	57.33	10.45	10.4	0.1
57.86	10.37	10.4	-0.1	57.86	10.43	10.5	0.0	57.86	10.49	10.5	0.0	57.86	10.44	10.4	0.0
58.39	10.46	10.5	0.0	58.39	10.47	10.5	0.0	58.39	10.51	10.5	0.0	58.39	10.44	10.4	0.0
58.93	10.44	10.5	-0.1	58.93	10.48	10.5	0.0	58.93	10.54	10.6	0.0	58.93	10.45	10.5	0.0
59.46	10.39	10.5	-0.1	59.46	10.48	10.5	0.0	59.46	10.56	10.6	0.0	59.46	10.49	10.5	0.0
60.00	10.45	10.5	-0.1	60.00	10.51	10.5	0.0	60.00	10.57	10.6	0.0	60.00	10.49	10.5	0.0
60.53	10.40	10.6	-0.2	60.53	10.51	10.6	-0.1	60.53	10.61	10.6	0.0	60.53	10.53	10.5	0.0
61.06	10.47	10.6	-0.1	61.06	10.54	10.6	0.0	61.06	10.64	10.6	0.0	61.06	10.52	10.5	0.0
61.60	10.46	10.6	-0.1	61.60	10.54	10.6	-0.1	61.60	10.63	10.7	0.0	61.60	10.53	10.5	0.0
62.13	10.54	10.6	-0.1	62.13	10.57	10.6	-0.1	62.13	10.67	10.7	0.0	62.13	10.49	10.6	-0.1
62.66	10.54	10.7	-0.1	62.66	10.58	10.6	-0.1	62.66	10.69	10.7	0.0	62.66	10.51	10.6	-0.1
63.20	10.71	10.7	0.0	63.20	10.67	10.7	0.0	63.20	10.71	10.7	0.0	63.20	10.60	10.6	0.0
63.73	10.67	10.7	0.0	63.73	10.67	10.7	0.0	63.73	10.73	10.7	0.0	63.73	10.60	10.6	0.0
64.26	10.67	10.7	0.0	64.26	10.68	10.7	0.0	64.26	10.76	10.8	0.0	64.26	10.61	10.6	0.0
64.79	10.70	10.7	0.0	64.79	10.68	10.7	0.0	64.79	10.78	10.8	0.0	64.79	10.57	10.6	-0.1
65.33	10.67	10.8	-0.1	65.33	10.70	10.7	0.0	65.33	10.79	10.8	0.0	65.33	10.64	10.7	0.0
65.86	10.76	10.8	0.0	65.86	10.73	10.8	0.0	65.86	10.79	10.8	0.0	65.86	10.65	10.7	0.0
66.40	10.76	10.8	0.0	66.40	10.75	10.8	0.0	66.40	10.81	10.8	0.0	66.40	10.67	10.7	0.0
66.93	10.76	10.8	-0.1	66.93	10.75	10.8	0.0	66.93	10.84	10.9	0.0	66.93	10.67	10.7	0.0

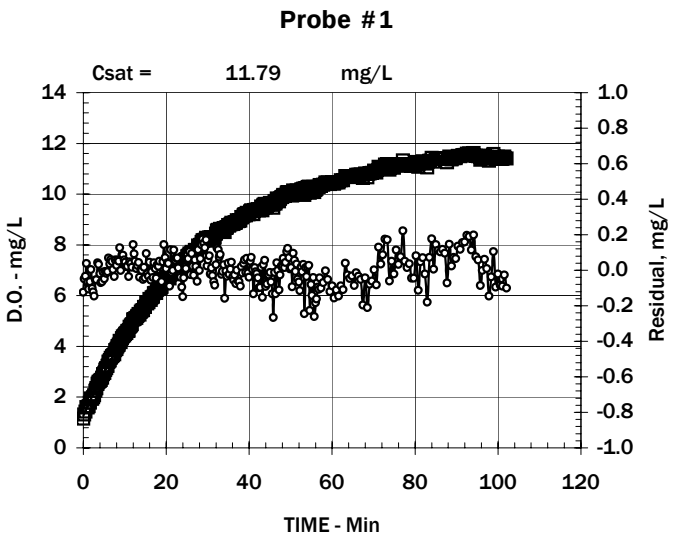
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.27	1.27		C0	2.13	2.13		C0	1.80	1.80		C0	3.34	3.34	
Kla-in	2.13	2.13		Kla-in	2.14	2.14		Kla-in	2.14	2.14		Kla-in	2.15	2.15	
C*	11.79	11.79		C*	11.66	11.66		C*	11.77	11.77		C*	11.43	11.43	
Sq.Diff.	2.1730			Sq.Diff.	0.3471			Sq.Diff.	0.1710			Sq.Diff.	0.2643		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
67.46	10.63	10.8	-0.2	67.46	10.72	10.8	-0.1	67.46	10.85	10.9	0.0	67.46	10.69	10.7	0.0
68.00	10.80	10.8	0.0	68.00	10.80	10.8	0.0	68.00	10.87	10.9	0.0	68.00	10.72	10.7	0.0
68.53	10.65	10.9	-0.2	68.53	10.76	10.8	-0.1	68.53	10.88	10.9	0.0	68.53	10.76	10.7	0.0
69.06	10.80	10.9	-0.1	69.06	10.82	10.9	0.0	69.06	10.89	10.9	0.0	69.06	10.76	10.8	0.0
69.59	10.84	10.9	-0.1	69.59	10.85	10.9	0.0	69.59	10.95	10.9	0.0	69.59	10.77	10.8	0.0
70.13	10.92	10.9	0.0	70.13	10.88	10.9	0.0	70.13	10.94	11.0	0.0	70.13	10.77	10.8	0.0
70.66	10.85	10.9	-0.1	70.66	10.87	10.9	0.0	70.66	10.95	11.0	0.0	70.66	10.80	10.8	0.0
71.20	11.08	10.9	0.1	71.20	10.95	10.9	0.0	71.20	10.95	11.0	0.0	71.20	10.81	10.8	0.0
71.73	11.00	11.0	0.0	71.73	10.93	10.9	0.0	71.73	10.99	11.0	0.0	71.73	10.81	10.8	0.0
72.26	11.07	11.0	0.1	72.26	10.99	10.9	0.0	72.26	11.02	11.0	0.0	72.26	10.87	10.8	0.0
72.79	11.17	11.0	0.2	72.79	11.01	11.0	0.1	72.79	11.02	11.0	0.0	72.79	10.85	10.8	0.0
73.33	11.18	11.0	0.2	73.33	11.02	11.0	0.1	73.33	11.04	11.0	0.0	73.33	10.84	10.8	0.0
73.86	10.96	11.0	-0.1	73.86	10.96	11.0	0.0	73.86	11.05	11.1	0.0	73.86	10.87	10.9	0.0
74.40	11.09	11.0	0.1	74.40	11.01	11.0	0.0	74.40	11.07	11.1	0.0	74.40	10.88	10.9	0.0
74.93	11.03	11.1	0.0	74.93	10.99	11.0	0.0	74.93	11.05	11.1	0.0	74.93	10.88	10.9	0.0
75.46	11.18	11.1	0.1	75.46	11.07	11.0	0.1	75.46	11.10	11.1	0.0	75.46	10.93	10.9	0.0
76.00	11.11	11.1	0.0	76.00	11.05	11.0	0.0	76.00	11.11	11.1	0.0	76.00	10.93	10.9	0.0
76.53	11.17	11.1	0.1	76.53	11.07	11.0	0.0	76.53	11.11	11.1	0.0	76.53	10.94	10.9	0.0
77.06	11.33	11.1	0.2	77.06	11.12	11.1	0.1	77.06	11.15	11.1	0.0	77.06	10.89	10.9	0.0
77.59	11.17	11.1	0.0	77.59	11.08	11.1	0.0	77.59	11.17	11.1	0.0	77.59	10.92	10.9	0.0
78.13	11.15	11.1	0.0	78.13	11.08	11.1	0.0	78.13	11.16	11.2	0.0	78.13	10.95	10.9	0.0
78.66	11.18	11.1	0.0	78.66	11.11	11.1	0.0	78.66	11.19	11.2	0.0	78.66	10.96	11.0	0.0
79.20	11.11	11.2	0.0	79.20	11.08	11.1	0.0	79.20	11.18	11.2	0.0	79.20	10.95	11.0	0.0
79.73	11.12	11.2	0.0	79.73	11.09	11.1	0.0	79.73	11.19	11.2	0.0	79.73	10.95	11.0	0.0
80.26	11.26	11.2	0.1	80.26	11.15	11.1	0.0	80.26	11.21	11.2	0.0	80.26	10.99	11.0	0.0
80.79	11.08	11.2	-0.1	80.79	11.09	11.1	0.0	80.79	11.21	11.2	0.0	80.79	10.99	11.0	0.0
81.33	11.25	11.2	0.0	81.33	11.16	11.1	0.0	81.33	11.24	11.2	0.0	81.33	10.99	11.0	0.0
81.86	11.28	11.2	0.1	81.86	11.19	11.2	0.0	81.86	11.25	11.2	0.0	81.86	11.04	11.0	0.0
82.40	11.20	11.2	0.0	82.40	11.19	11.2	0.0	82.40	11.27	11.2	0.0	82.40	11.09	11.0	0.1
82.93	11.05	11.2	-0.2	82.93	11.12	11.2	0.0	82.93	11.26	11.3	0.0	82.93	11.05	11.0	0.0
83.46	11.32	11.2	0.1	83.46	11.24	11.2	0.1	83.46	11.29	11.3	0.0	83.46	11.10	11.0	0.1
84.00	11.43	11.3	0.2	84.00	11.27	11.2	0.1	84.00	11.32	11.3	0.0	84.00	11.07	11.0	0.0
84.53	11.27	11.3	0.0	84.53	11.21	11.2	0.0	84.53	11.29	11.3	0.0	84.53	11.08	11.0	0.0
85.06	11.42	11.3	0.1	85.06	11.26	11.2	0.1	85.06	11.29	11.3	0.0	85.06	11.07	11.0	0.0
85.59	11.40	11.3	0.1	85.59	11.27	11.2	0.1	85.59	11.32	11.3	0.0	85.59	11.11	11.1	0.1
86.13	11.40	11.3	0.1	86.13	11.26	11.2	0.0	86.13	11.33	11.3	0.0	86.13	11.04	11.1	0.0
86.66	11.42	11.3	0.1	86.66	11.26	11.2	0.0	86.66	11.31	11.3	0.0	86.66	11.05	11.1	0.0
87.20	11.41	11.3	0.1	87.20	11.28	11.2	0.0	87.20	11.34	11.3	0.0	87.20	11.10	11.1	0.0
87.73	11.25	11.3	-0.1	87.73	11.24	11.2	0.0	87.73	11.36	11.3	0.0	87.73	11.12	11.1	0.0
88.26	11.48	11.3	0.1	88.26	11.32	11.3	0.1	88.26	11.37	11.3	0.0	88.26	11.12	11.1	0.0
88.79	11.36	11.3	0.0	88.79	11.28	11.3	0.0	88.79	11.39	11.4	0.0	88.79	11.10	11.1	0.0
89.33	11.42	11.3	0.1	89.33	11.32	11.3	0.0	89.33	11.37	11.4	0.0	89.33	11.16	11.1	0.1
89.86	11.42	11.4	0.1	89.86	11.32	11.3	0.0	89.86	11.40	11.4	0.0	89.86	11.13	11.1	0.0
90.40	11.50	11.4	0.1	90.40	11.35	11.3	0.1	90.40	11.39	11.4	0.0	90.40	11.17	11.1	0.1
90.93	11.49	11.4	0.1	90.93	11.34	11.3	0.0	90.93	11.40	11.4	0.0	90.93	11.12	11.1	0.0
91.46	11.53	11.4	0.2	91.46	11.37	11.3	0.1	91.46	11.41	11.4	0.0	91.46	11.16	11.1	0.0
92.00	11.55	11.4	0.2	92.00	11.39	11.3	0.1	92.00	11.41	11.4	0.0	92.00	11.20	11.1	0.1
92.53	11.59	11.4	0.2	92.53	11.40	11.3	0.1	92.53	11.43	11.4	0.0	92.53	11.17	11.1	0.0
93.06	11.59	11.4	0.2	93.06	11.41	11.3	0.1	93.06	11.43	11.4	0.0	93.06	11.20	11.1	0.1
93.59	11.52	11.4	0.1	93.59	11.37	11.3	0.0	93.59	11.44	11.4	0.0	93.59	11.16	11.2	0.0
94.13	11.61	11.4	0.2	94.13	11.40	11.3	0.1	94.13	11.47	11.4	0.0	94.13	11.13	11.2	0.0
94.66	11.50	11.4	0.1	94.66	11.36	11.3	0.0	94.66	11.42	11.4	0.0	94.66	11.16	11.2	0.0
95.20	11.49	11.4	0.1	95.20	11.36	11.3	0.0	95.20	11.43	11.4	0.0	95.20	11.16	11.2	0.0
95.73	11.35	11.4	-0.1	95.73	11.33	11.4	0.0	95.73	11.47	11.4	0.0	95.73	11.17	11.2	0.0
96.26	11.44	11.4	0.0	96.26	11.37	11.4	0.0	96.26	11.48	11.5	0.0	96.26	11.18	11.2	0.0
96.79	11.51	11.4	0.1	96.79	11.39	11.4	0.0	96.79	11.48	11.5	0.0	96.79	11.17	11.2	0.0
97.33	11.47	11.5	0.0	97.33	11.39	11.4	0.0	97.33	11.50	11.5	0.0	97.33	11.20	11.2	0.0
97.86	11.32	11.5	-0.1	97.86	11.32	11.4	-0.1	97.86	11.48	11.5	0.0	97.86	11.17	11.2	0.0
98.40	11.43	11.5	0.0	98.40	11.37	11.4	0.0	98.40	11.50	11.5	0.0	98.40	11.18	11.2	0.0
98.93	11.58	11.5	0.1	98.93	11.42	11.4	0.0	98.93	11.49	11.5	0.0	98.93	11.20	11.2	0.0
99.46	11.39	11.5	-0.1	99.46	11.35	11.4	0.0	99.46	11.50	11.5	0.0	99.46	11.17	11.2	0.0
100.00	11.47	11.5	0.0	100.00	11.39	11.4	0.0	100.00	11.50	11.5	0.0	100.00	11.20	11.2	0.0
100.53	11.41	11.5	-0.1	100.53	11.37	11.4	0.0	100.53	11.50	11.5	0.0	100.53	11.20	11.2	0.0
101.06	11.41	11.5	-0.1	101.06	11.38	11.4	0.0	101.06	11.51	11.5	0.0	101.06	11.21	11.2	0.0
101.59	11.48	11.5	0.0	101.59	11.38	11.4	0.0	101.59	11.49	11.5	0.0	101.59	11.17	11.2	-0.1
102.13	11.41	11.5	-0.1	102.13	11.37	11.4	0.0	102.13	11.52	11.5	0.0	102.13	11.17	11.2	-0.1

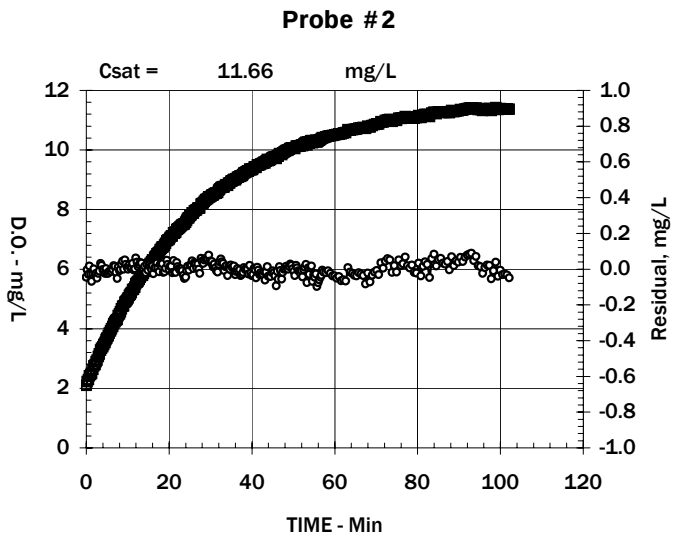
	Probe 1				Probe 2				Probe 3				Probe 4		
Lower	9.69%			Lower	17.92%			Lower	14.84%			Lower	29.56%		
Upper	98.51%			Upper	97.93%			Upper	97.88%			Upper	98.07%		
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE
C*	11.789	0.016	0.135	C*	11.665	0.006	0.054	C*	11.771	0.004	0.038	C*	11.434	0.006	0.048
C0	1.266	0.019	1.487	C0	2.135	0.008	0.353	C0	1.803	0.005	0.293	C0	3.336	0.007	0.197
KLaT	2.129	0.000	0.497	KLaT	2.140	0.000	0.219	KLaT	2.144	0.000	0.147	KLaT	2.150	0.000	0.224
Error	0.086			Error	0.034			Error	0.024			Error	0.030		

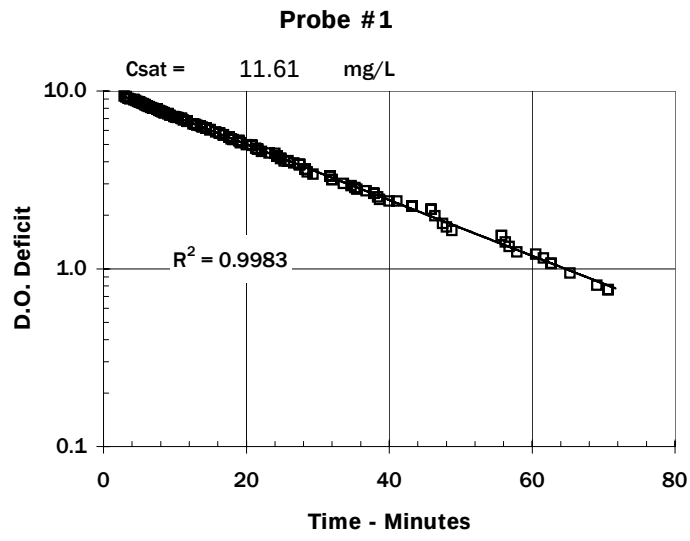
PROJECT: PHi - Membrane Tube Diffusers Only
DATE: 11/8/2006
RUN: 2.00

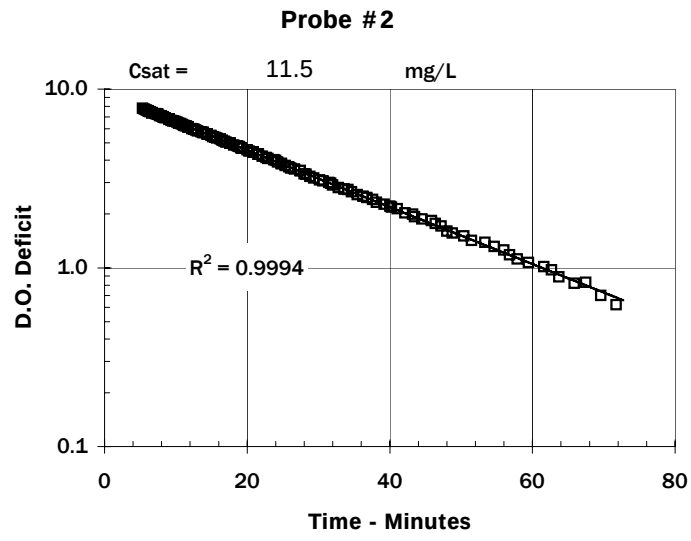




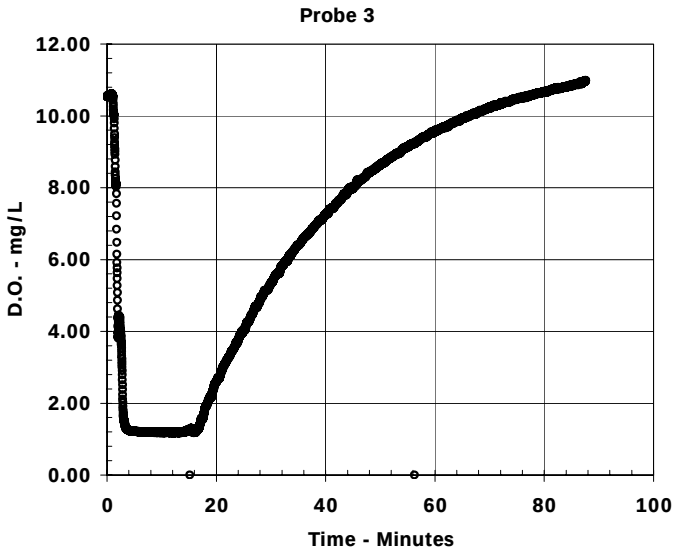


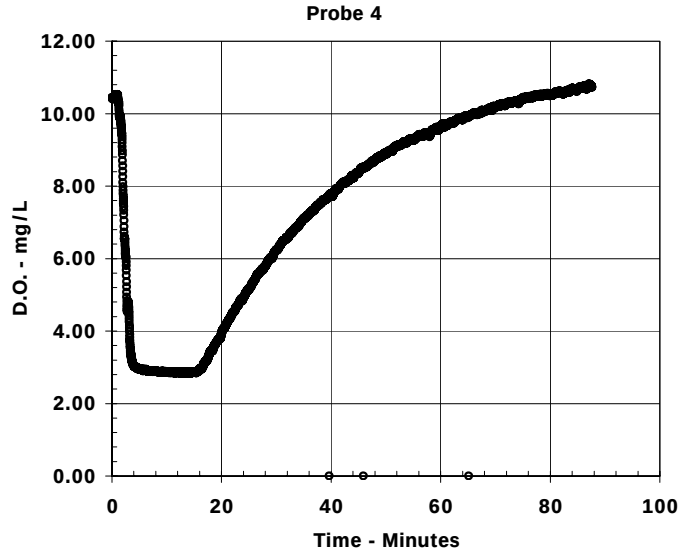


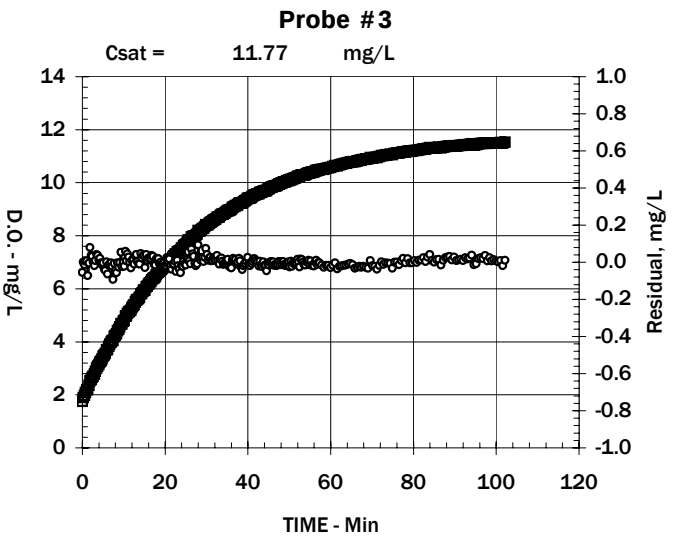


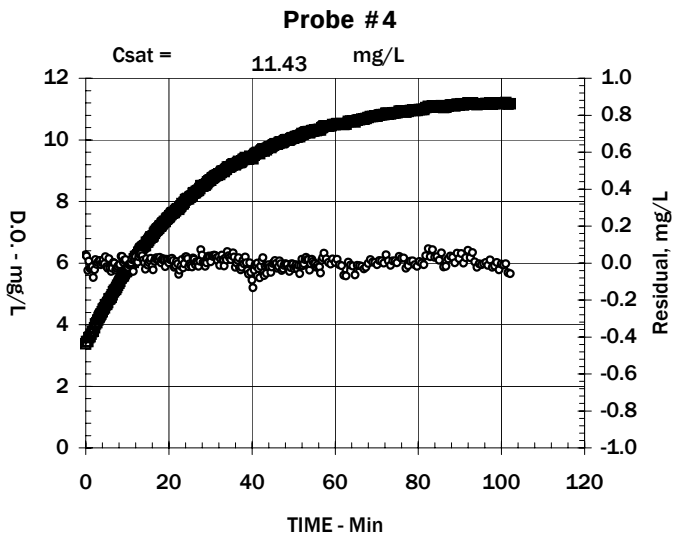


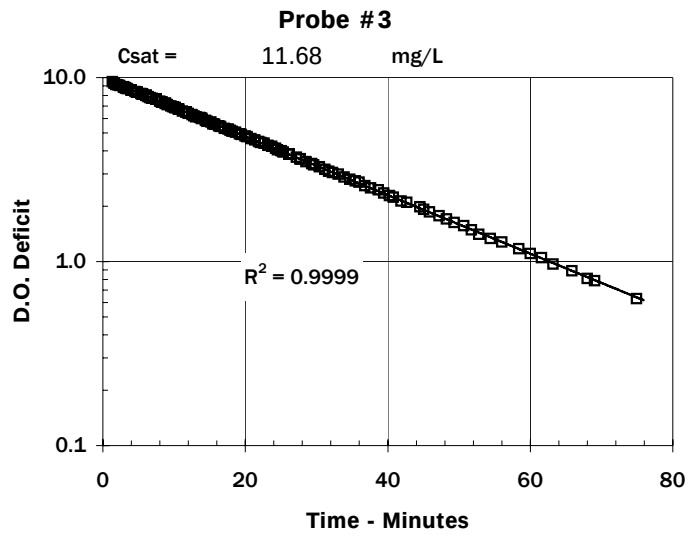
Project: PHi - Membrane Tube Diffusers Only
Date: Nov 08, 2006
Run: 2

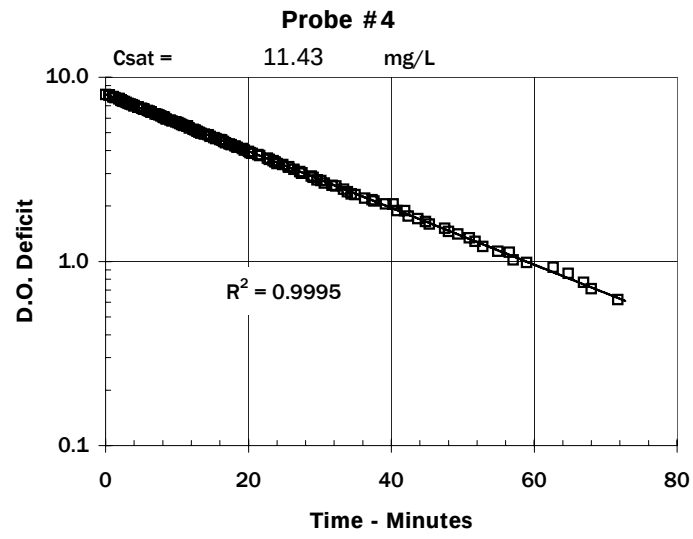












Project: PHi - Membrane Tube Diffusers Only
Date: Nov 08, 2006
Run: 2

AIR FLOW RATE DETERMINATION
ANR 73 COMMERCIAL ANNUBAR

PROJECT : PHi - Membrane Tube Diffusers Only

SCFM = $C'' \frac{[BP + LP]}{[LT + 460]}$

C' = Fna * k * D^2 * Fra * Fpb * Ftb * Fg * Fpv * Faa * Fl * Fm * Ya

C'' = C' VALUE CORRECTED FOR HUMIDITY

RUN	#		**2**	
DATE			Nov-06	
OPERATING CONDITIONS			AWR-73	
ANNUBAR TYPE			2	
BAROMETRIC PRESSURE	* **BP**		14.19	PSIA
LINE PRESSURE	* **LP**		8.87	PSIG
LINE TEMPERATURE	* **LT**		130	°F
DIFFERENTIAL PRESSURE	* **^H**		0.02	In. H2O
RELATIVE HUMIDITY	* **RH**		68%	%
AMBIENT TEMPERATURE	*	**15.5**	62	°F
PIPE INSIDE DIAMETER	* **D**		4.026	In.
UNITS CONVERSION FACTOR	**Fna**		128.520	
ANNUBAR FLOW COEFFICIENT	**k**		0.746	
SQUARE OF PIPE ID	**D^2**		16.209	
BASE PRESSURE			14.700	PSIA
BASE PRESSURE FACTOR	**Fpb**		1.002	
BASE TEMPERATURE			68.000	°F
BASE TEMPERATURE FACTOR	**Ftb**		1.015	
THERMAL EXPANSION FACTOR	**Faa**		1.002	
MANOMETER LOCATION FACTOR	**Fl**		1.000	
HG MANOMETER CORRECTION FACTOR	**Fm**		1.000	
REYNOLD NUMBER	**Rd**		15,211.9	
FLOWING VICOSITY	**vis**		0.020	cP
REYNOLD NUMBER FACTOR	**Fra**		0.965	
SPECIFIC GRAVITY	**g**		1.000	
SPECIFIC GRAVITY FACTOR	**Fg**		1.000	
SUPERCOMPRESSIBILTY	**Z**		1.000	
SUPERCOMPRESSIBILTY FACTOR	**Fpv**		1.000	
GAS EXPANSION FACTOR	**Ya**		1.000	
SCFM UNCORRECTED FOR HUMIDITY	**SCFM**		41.6	
C'			1,527.58	
VAPOR PRESSURE OF WATER AMB. TEMP.	**VP**		0.275	
ACTUAL CUBIC FEET PER MINUTE	**ACFM**		29.6	335.4
HUMIDITY CORRECTED STANDARD AIR FLOW	**SCFM**		**41.4**	@68°F, 36% RH, 14.7 PSIA
INLET CUBIC FEET PER MINUTE	**ICFM**		**48.1**	
C''			**1,519.15**	

FORMULAS AND FACTORS DERIVED FROM: L.K.Spink; "Principles and Practice of FLOW METER ENGINEERING"; Ninth Ed., Nov 1975; The FOXBORO CO., Foxboro, Mass.
"ORIFICE FLOW METER"; THE BRISTOL COMPANY; Waterbury, Conn.
"ANNUBAR FLOW HANDBOOK"; August 1978; DIETERICH STANDARD CORPORATION; Boulder, Co.

HUMIDITY CORRECTED AIR FLOW DETERMINED per: "ASCE STANDARD Measurement of Oxygen Transfer in Clean Water";ANNEX A; July 1984; American Society of Civil Engineers

GSEE, Inc.

Environmental Services

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: PHi - Membrane Tube Diffusers + PHi Pumping
DATE: 8-Nov-06
RUN: 3

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

	Initial	Mid Point	Final
Barometric Pres. (PSIA)	14.182	14.180	14.176
(mm Hg)	733.40	733.30	733.10
Ambient Temperature (°F)	63.90	64.20	65.10
Relative Humidity (%)	65%	64%	63%
Line Pressure (PSIG)	8.866	8.866	8.866
(In. Hg)	18.05	18.05	18.05
Line Temperature (°F)	135.00	136.00	136.00
ΔH Air Flow Dev. 1 (Annubar)	0.019	0.018	0.017
ΔH Air Flow Dev. 2 (Orifice)	2.450	2.350	2.100
ΔH Air Flow Dev. 3 (Annubar)	NA	NA	NA
ΔH Air Flow Dev. 4 (Annubar)	NA	NA	NA
Water Temp. (°C)	14.69	14.70	14.72
Orifice Diameter (in)		1.349	
Number Of Aeration Devices		28	
Side Water Depth (ft)		19.75	(6.00 m)
Air Release Depth (ft)		18.75	(5.70 m)
Tank Length (ft)		0.00	(0.00 m)
Tank Width (ft)		0.00	(0.00 m)
Tank Diameter (ft)		21.00	(6.38 m)
Gear Reducer or Belt Efficiency		100.0%	
Motor Efficiency		89.0%	
Total HP_{wire} av.		2.69	(2.01 kw)

C' Air Flow Device 1 (Annubar)	1,518.75
Air Flow Device 1 (SCFM)	40.08
C' Air Flow Device 2 (Orifce)	133.88
Air Flow Device 2 (SCFM)	39.94
Average Air Flow (SCFM)	40.01
Effective Depth Correction (f)	0.32
Headloss (In. H_2O)	20.42
C* (mg/l)	11.60
$C_{sm}T$ (Standard Methods, mg/l)	10.15
C^*_{20} Standard Conditions	10.72
Tank Volume (Ft³)	6,840.6
(Gallons)	51,171.4
(m³)	193.7
(Million Pounds)	0.427
#Na_2SO_3 @ 160% Stoichiometric	63
Cobalt Concen. (mg/l)	0.100
Grams Cobalt Chloride	79.9
Total HP_{motor} av.	2.39
TDS (mg/L)	568.00

NON-LINEAR REGRESSION RESULTS

Probe	K_{LaT}	K_{La20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Std. Err.
1	2.58	2.93	13.58	0.48	32.75	5.05	11.70	0.0600
2	2.51	2.84	12.95	0.46	31.24	4.81	11.49	0.1001
3	2.58	2.92	13.51	0.48	32.59	5.02	11.66	0.0199
4	2.55	2.89	13.26	0.47	32.00	4.93	11.56	0.0316
avg.	2.55	2.90	13.32	0.48	32.14	4.95	11.60	0.0529
Avg	*2.56*	*2.91*	*13.38*	*0.48*	*32.29*	*4.98*	*11.61*	Exclude Max&Min
TDS	***2.66***	***3.02***	***13.89***	***0.50***	***33.51***	***5.16***	***11.60***	***1.79%***
Corrected	/hr	/hr	#O2/hr	0.444	%	#O2/hr-WHP		

OXYGEN TRANSFER

Total SCFM:	**40.0**	**64.320**	**:Nm³/Hr**	**18.881**	**L/s**	**#O2/Hr:**	**13.89**	**6.300**	**:KgO2/Hr**
SCFM/Diff.:	**1.43**	**2.297**	**:Nm³/hr/Diff**			**#O2/Hr/Diff.:**	**0.50**	**0.225**	**:KgO2/Hr/Diff.**
SCFM/KCF:	**5.8**	**0.332**	**:Nm³/hr/m³**			**#O2/Day:**	**333.3**	**151.2**	**:KgO2/Day**
Total ICFM:	**47.1**	**22.24**	**L/s**			**#O2/Day/1000 Ft³:**	**49**	**0.78**	**:KgO2/Day/m³**

LINEAR REGRESSION RESULTS

Probe	K_{LaT}	K_{La20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Corr.Coeff.
1	2.65	3.00	13.79	0.49	33.27	5.13	11.59	0.9990
2	2.69	3.05	13.69	0.49	33.03	5.09	11.33	0.9992
3	2.68	3.04	13.93	0.50	33.61	5.18	11.55	0.9996
4	2.54	2.88	13.22	0.47	31.90	4.92	11.56	0.9996
avg.	2.64	2.99	13.66	0.49	32.95	5.08	11.51	0.9994
Avg	*2.67*	*3.02*	*13.84*	*0.49*	*33.40*	*5.15*	*11.56*	Exclude Max&Min
TDS	***2.75***	***3.12***	***14.24***	***0.51***	***34.36***	***5.30***	***11.51***	
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-HPw		

EUROPEAN STANDARD

Probe	K_{LaT}	K_{La10}	SOTR	SOTR/Dev	SAE	C*
1	2.61	2.35	6.16	0.22	3.07	11.70
2	2.60	2.33	6.01	0.21	3.00	11.49
3	2.63	2.36	6.17	0.22	3.08	11.66
4	2.55	2.29	5.93	0.21	2.96	11.56
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
avg.	2.60	2.33	6.06	0.22	3.02	11.60
Avg	*2.61*	*2.34*	*6.08*	*0.22*	*3.03*	*11.61*
TDS	***2.71***	***2.43***	***6.32***	***0.23***	***3.15***	***11.60***
Corrected	/hr	/hr	kg O_2/hr		kg O_2/hr-kw	mg/L

Exclude Max&Min

Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	0.78	0.78		C0	3.21	3.21		C0	0.99	0.99		C0	2.32	2.32	
Kla-in	2.58	2.58		Kla-in	2.51	2.51		Kla-in	2.58	2.58		Kla-in	2.55	2.55	
C*	11.70	11.70		C*	11.49	11.49		C*	11.66	11.66		C*	11.56	11.56	
Sq.Diff.	1.0700			Sq.Diff.	2.9772			Sq.Diff.	0.1171			Sq.Diff.	0.2961		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	0.98	0.8	0.2	0.00	3.22	3.2	0.0	0.00	1.00	1.0	0.0	0.00	2.40	2.3	0.1
0.31	1.07	0.9	0.2	0.31	3.57	3.3	0.3	0.31	1.13	1.1	0.0	0.31	2.52	2.4	0.1
0.58	1.03	1.0	0.0	0.58	3.33	3.4	-0.1	0.58	1.26	1.3	0.0	0.58	2.60	2.5	0.1
0.84	1.14	1.2	0.0	0.84	3.33	3.5	-0.2	0.84	1.35	1.4	0.0	0.84	2.66	2.6	0.0
1.11	1.26	1.3	0.0	1.11	3.56	3.6	0.0	1.11	1.47	1.5	0.0	1.11	2.73	2.7	0.0
1.38	1.43	1.4	0.0	1.38	4.39	3.7	0.7	1.38	1.58	1.6	0.0	1.38	2.84	2.9	0.0
1.64	1.53	1.5	0.0	1.64	4.07	3.8	0.3	1.64	1.73	1.7	0.0	1.64	2.95	2.9	0.0
1.91	1.68	1.6	0.0	1.91	4.16	3.8	0.3	1.91	1.88	1.8	0.0	1.91	3.07	3.0	0.0
2.18	1.75	1.8	0.0	2.18	3.83	3.9	-0.1	2.18	1.93	1.9	0.0	2.18	3.13	3.1	0.0
2.45	1.82	1.9	0.0	2.45	3.85	4.0	-0.2	2.45	2.07	2.1	0.0	2.45	3.19	3.2	0.0
2.71	2.05	2.0	0.1	2.71	3.98	4.1	-0.1	2.71	2.14	2.2	0.0	2.71	3.32	3.3	0.0
2.98	2.10	2.1	0.0	2.98	4.35	4.2	0.2	2.98	2.24	2.3	0.0	2.98	3.41	3.4	0.0
3.25	2.17	2.2	0.0	3.25	4.17	4.3	-0.1	3.25	2.36	2.4	0.0	3.25	3.51	3.5	0.0
3.51	2.32	2.3	0.0	3.51	4.32	4.3	0.0	3.51	2.48	2.5	0.0	3.51	3.62	3.6	0.0
3.78	2.38	2.4	0.0	3.78	4.69	4.4	0.3	3.78	2.60	2.6	0.0	3.78	3.73	3.7	0.0
4.04	2.55	2.5	0.0	4.04	4.49	4.5	0.0	4.04	2.72	2.7	0.0	4.04	3.80	3.8	0.0
4.31	2.59	2.6	0.0	4.31	4.58	4.6	0.0	4.31	2.82	2.8	0.0	4.31	3.86	3.9	0.0
4.58	2.76	2.7	0.0	4.58	4.53	4.7	-0.1	4.58	2.93	2.9	0.0	4.58	3.96	4.0	0.0
4.84	2.85	2.8	0.0	4.84	4.66	4.7	-0.1	4.84	3.00	3.0	0.0	4.84	4.03	4.0	0.0
5.11	2.92	2.9	0.0	5.11	4.65	4.8	-0.2	5.11	3.14	3.1	0.0	5.11	4.08	4.1	0.0
5.38	3.04	3.0	0.0	5.38	4.69	4.9	-0.2	5.38	3.24	3.2	0.0	5.38	4.16	4.2	-0.1
5.65	3.07	3.1	-0.1	5.65	4.69	5.0	-0.3	5.65	3.33	3.3	0.0	5.65	4.28	4.3	0.0
5.91	3.26	3.2	0.0	5.91	4.91	5.0	-0.1	5.91	3.41	3.4	0.0	5.91	4.36	4.4	0.0
6.18	3.29	3.3	0.0	6.18	4.90	5.1	-0.2	6.18	3.50	3.5	0.0	6.18	4.43	4.5	0.0
6.45	3.40	3.4	0.0	6.45	5.55	5.2	0.4	6.45	3.55	3.6	0.0	6.45	4.49	4.5	-0.1
6.71	3.51	3.5	0.0	6.71	5.14	5.2	-0.1	6.71	3.62	3.7	0.0	6.71	4.58	4.6	0.0
6.98	3.59	3.6	0.0	6.98	5.15	5.3	-0.2	6.98	3.76	3.8	0.0	6.98	4.65	4.7	0.0
7.25	3.68	3.7	0.0	7.25	6.09	5.4	0.7	7.25	3.83	3.8	0.0	7.25	4.76	4.8	0.0
7.51	3.85	3.8	0.1	7.51	5.56	5.4	0.1	7.51	3.88	3.9	-0.1	7.51	4.82	4.8	0.0
7.78	3.85	3.9	0.0	7.78	5.46	5.5	0.0	7.78	4.03	4.0	0.0	7.78	4.91	4.9	0.0
8.05	3.97	4.0	0.0	8.05	5.43	5.6	-0.1	8.05	4.14	4.1	0.0	8.05	5.01	5.0	0.0
8.31	3.96	4.1	-0.1	8.31	5.48	5.6	-0.2	8.31	4.19	4.2	0.0	8.31	5.05	5.1	0.0
8.58	4.11	4.1	0.0	8.58	5.59	5.7	-0.1	8.58	4.28	4.3	0.0	8.58	5.14	5.1	0.0
8.84	4.17	4.2	-0.1	8.84	5.66	5.8	-0.1	8.84	4.36	4.4	0.0	8.84	5.21	5.2	0.0
9.11	4.27	4.3	0.0	9.11	5.67	5.8	-0.2	9.11	4.47	4.4	0.0	9.11	5.32	5.3	0.0
9.38	4.43	4.4	0.0	9.38	5.73	5.9	-0.2	9.38	4.56	4.5	0.0	9.38	5.38	5.4	0.0
9.65	4.50	4.5	0.0	9.65	6.01	6.0	0.1	9.65	4.58	4.6	0.0	9.65	5.41	5.4	0.0
9.91	4.59	4.6	0.0	9.91	6.12	6.0	0.1	9.91	4.67	4.7	0.0	9.91	5.46	5.5	0.0
10.18	4.62	4.6	0.0	10.18	6.14	6.1	0.1	10.18	4.78	4.8	0.0	10.18	5.60	5.6	0.0
10.44	4.73	4.7	0.0	10.44	6.24	6.1	0.1	10.44	4.82	4.8	0.0	10.44	5.64	5.6	0.0
10.71	4.79	4.8	0.0	10.71	6.24	6.2	0.0	10.71	4.92	4.9	0.0	10.71	5.69	5.7	0.0
10.98	4.92	4.9	0.0	10.98	6.25	6.3	0.0	10.98	4.97	5.0	0.0	10.98	5.77	5.8	0.0
11.25	4.90	5.0	-0.1	11.25	6.23	6.3	-0.1	11.25	5.05	5.1	0.0	11.25	5.84	5.8	0.0
11.51	5.03	5.0	0.0	11.51	6.26	6.4	-0.1	11.51	5.15	5.2	0.0	11.51	5.92	5.9	0.0
11.78	5.15	5.1	0.0	11.78	6.62	6.4	0.2	11.78	5.22	5.2	0.0	11.78	5.99	6.0	0.0
12.05	5.20	5.2	0.0	12.05	6.43	6.5	-0.1	12.05	5.35	5.3	0.0	12.05	6.03	6.0	0.0
12.31	5.21	5.3	-0.1	12.31	6.41	6.5	-0.1	12.31	5.40	5.4	0.0	12.31	6.09	6.1	0.0
12.58	5.31	5.3	0.0	12.58	6.49	6.6	-0.1	12.58	5.47	5.4	0.0	12.58	6.18	6.2	0.0
12.84	5.45	5.4	0.0	12.84	6.58	6.6	-0.1	12.84	5.55	5.5	0.0	12.84	6.21	6.2	0.0
13.11	5.45	5.5	0.0	13.11	6.61	6.7	-0.1	13.11	5.59	5.6	0.0	13.11	6.27	6.3	0.0
13.38	5.54	5.6	0.0	13.38	6.61	6.8	-0.1	13.38	5.63	5.7	0.0	13.38	6.30	6.3	0.0
13.65	5.54	5.6	-0.1	13.65	6.63	6.8	-0.2	13.65	5.73	5.7	0.0	13.65	6.39	6.4	0.0
13.91	5.60	5.7	-0.1	13.91	6.78	6.9	-0.1	13.91	5.76	5.8	0.0	13.91	6.45	6.4	0.0
14.18	5.71	5.8	-0.1	14.18	6.83	6.9	-0.1	14.18	5.84	5.9	0.0	14.18	6.52	6.5	0.0
14.44	5.71	5.8	-0.1	14.44	6.86	7.0	-0.1	14.44	5.87	5.9	-0.1	14.44	6.57	6.6	0.0
14.71	5.85	5.9	0.0	14.71	6.91	7.0	-0.1	14.71	5.93	6.0	-0.1	14.71	6.66	6.6	0.0
14.98	5.96	6.0	0.0	14.98	6.97	7.1	-0.1	14.98	6.02	6.1	0.0	14.98	6.72	6.7	0.0
15.25	6.08	6.0	0.0	15.25	7.06	7.1	-0.1	15.25	6.12	6.1	0.0	15.25	6.76	6.7	0.0
15.51	6.06	6.1	0.0	15.51	7.03	7.2	-0.1	15.51	6.18	6.2	0.0	15.51	6.76	6.8	0.0
15.78	6.10	6.2	-0.1	15.78	7.15	7.2	-0.1	15.78	6.21	6.2	0.0	15.78	6.85	6.8	0.0
16.05	6.13	6.2	-0.1	16.05	7.19	7.3	-0.1	16.05	6.30	6.3	0.0	16.05	6.90	6.9	0.0
16.31	6.29	6.3	0.0	16.31	7.22	7.3	-0.1	16.31	6.39	6.4	0.0	16.31	6.97	6.9	0.0
16.58	6.31	6.3	0.0	16.58	7.38	7.3	0.0	16.58	6.41	6.4	0.0	16.58	7.01	7.0	0.0
16.85	6.42	6.4	0.0	16.85	7.39	7.4	0.0	16.85	6.46	6.5	0.0	16.85	7.05	7.1	0.0
17.11	6.46	6.5	0.0	17.11	7.43	7.4	0.0	17.11	6.52	6.5	0.0	17.11	7.12	7.1	0.0
17.38	6.47	6.5	-0.1	17.38	7.47	7.5	0.0	17.38	6.61	6.6	0.0	17.38	7.16	7.2	0.0
17.64	6.61	6.6	0.0	17.64	7.63	7.5	0.1	17.64	6.66	6.7	0.0	17.64	7.22	7.2	0.0
17.91	6.67	6.6	0.0	17.91	7.59	7.6	0.0	17.91	6.68	6.7	0.0	17.91	7.27	7.2	0.0
18.18	6.73	6.7	0.0	18.18	7.57	7.6	0.0	18.18	6.80	6.8	0.0	18.18	7.30	7.3	0.0
18.44	6.78	6.8	0.0	18.44	7.59	7.7	-0.1	18.44	6.84	6.8	0.0	18.44	7.36	7.3	0.0
18.71	6.87	6.8	0.1	18.71	7.62	7.7	-0.1	18.71	6.89	6.9	0.0	18.71	7.42	7.4	0.0
18.98	6.87	6.9	0.0	18.98	7.71	7.7	0.0	18.98	6.95	6.9	0.0	18.98	7.43	7.4	0.0
19.25	6.96	6.9	0.0	19.25	7.75	7.8	0.0	19.25	7.00	7.0	0.0	19.25	7.49	7.5	0.0
19.51	6.96	7.0	0.0	19.51	7.82	7.8	0.0	19.51	7.08	7.0	0.0	19.51	7.54	7.5	0.0
19.78	7.08	7.0	0.0	19.78	7.85	7.9	0.0	19.78	7.12	7.1	0.0	19.78	7.57	7.6	0.0
20.05	7.09	7.1	0.0	20.05	7.85	7.9	-0.1	20.05	7.15	7.1	0.0	20.05	7.63	7.6	0.0
20.31	7.09	7.1	-0.1	20.31	7.86	7.9	-0.1	20.31	7.20	7.2	0.0	20.31	7.66	7.7	0.0
20.58	7.17	7.2	0.0	20.58	7.92	8.0	-0.1	20.58	7.25	7.3	0.0	20.58	7.67	7.7	0.0

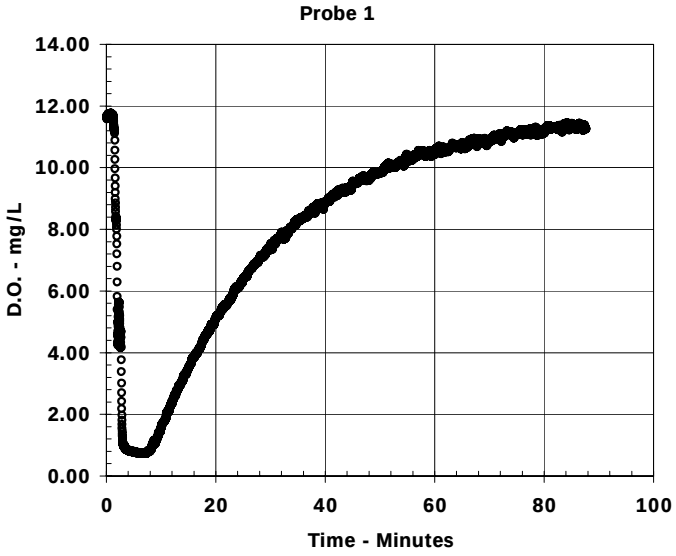
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	0.78	0.78		C0	3.21	3.21		C0	0.99	0.99		C0	2.32	2.32	
Kla-in	2.58	2.58		Kla-in	2.51	2.51		Kla-in	2.58	2.58		Kla-in	2.55	2.55	
C*	11.70	11.70		C*	11.49	11.49		C*	11.66	11.66		C*	11.56	11.56	
Sq.Diff.	1.0700			Sq.Diff.	2.9772			Sq.Diff.	0.1171			Sq.Diff.	0.2961		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
20.85	7.25	7.2	0.0	20.85	7.95	8.0	-0.1	20.85	7.27	7.3	0.0	20.85	7.76	7.8	0.0
21.11	7.28	7.3	0.0	21.11	7.99	8.1	-0.1	21.11	7.35	7.4	0.0	21.11	7.79	7.8	0.0
21.38	7.35	7.3	0.0	21.38	8.05	8.1	-0.1	21.38	7.38	7.4	0.0	21.38	7.84	7.8	0.0
21.64	7.47	7.4	0.1	21.64	8.12	8.1	0.0	21.64	7.44	7.4	0.0	21.64	7.87	7.9	0.0
21.91	7.48	7.4	0.0	21.91	8.16	8.2	0.0	21.91	7.52	7.5	0.0	21.91	7.93	7.9	0.0
22.18	7.46	7.5	0.0	22.18	8.21	8.2	0.0	22.18	7.52	7.5	0.0	22.18	7.94	8.0	0.0
22.44	7.61	7.5	0.1	22.44	8.25	8.2	0.0	22.44	7.56	7.6	0.0	22.44	8.00	8.0	0.0
22.71	7.60	7.6	0.0	22.71	8.35	8.3	0.1	22.71	7.60	7.6	0.0	22.71	8.05	8.0	0.0
22.98	7.67	7.6	0.0	22.98	8.28	8.3	0.0	22.98	7.68	7.7	0.0	22.98	8.10	8.1	0.0
23.25	7.71	7.7	0.0	23.25	8.39	8.4	0.0	23.25	7.73	7.7	0.0	23.25	8.15	8.1	0.0
23.51	7.80	7.7	0.1	23.51	8.42	8.4	0.0	23.51	7.79	7.8	0.0	23.51	8.19	8.2	0.0
23.78	7.90	7.8	0.1	23.78	8.49	8.4	0.1	23.78	7.81	7.8	0.0	23.78	8.24	8.2	0.0
24.05	7.77	7.8	0.0	24.05	8.65	8.5	0.2	24.05	7.83	7.9	0.0	24.05	8.23	8.2	0.0
24.31	7.69	7.9	-0.2	24.31	8.51	8.5	0.0	24.31	7.90	7.9	0.0	24.31	8.24	8.3	0.0
24.58	7.84	7.9	-0.1	24.58	8.56	8.5	0.0	24.58	7.96	7.9	0.0	24.58	8.32	8.3	0.0
24.85	7.93	8.0	0.0	24.85	8.58	8.6	0.0	24.85	8.02	8.0	0.0	24.85	8.37	8.4	0.0
25.11	8.00	8.0	0.0	25.11	8.61	8.6	0.0	25.11	8.07	8.0	0.0	25.11	8.40	8.4	0.0
25.38	8.04	8.0	0.0	25.38	8.96	8.6	0.3	25.38	8.07	8.1	0.0	25.38	8.45	8.4	0.0
25.64	8.05	8.1	0.0	25.64	8.67	8.7	0.0	25.64	8.09	8.1	0.0	25.64	8.43	8.5	0.0
25.91	8.12	8.1	0.0	25.91	8.70	8.7	0.0	25.91	8.13	8.2	0.0	25.91	8.46	8.5	0.0
26.18	8.24	8.2	0.1	26.18	8.75	8.7	0.0	26.18	8.18	8.2	0.0	26.18	8.52	8.5	0.0
26.44	8.23	8.2	0.0	26.44	8.79	8.7	0.0	26.44	8.22	8.2	0.0	26.44	8.56	8.6	0.0
26.71	8.27	8.2	0.0	26.71	8.77	8.8	0.0	26.71	8.29	8.3	0.0	26.71	8.61	8.6	0.0
26.98	8.34	8.3	0.1	26.98	8.84	8.8	0.0	26.98	8.32	8.3	0.0	26.98	8.67	8.6	0.0
27.25	8.36	8.3	0.0	27.25	8.81	8.8	0.0	27.25	8.33	8.3	0.0	27.25	8.67	8.7	0.0
27.51	8.33	8.4	0.0	27.51	8.87	8.9	0.0	27.51	8.39	8.4	0.0	27.51	8.74	8.7	0.0
27.78	8.39	8.4	0.0	27.78	8.88	8.9	0.0	27.78	8.40	8.4	0.0	27.78	8.75	8.7	0.0
28.05	8.46	8.4	0.0	28.05	8.92	8.9	0.0	28.05	8.44	8.5	0.0	28.05	8.77	8.8	0.0
28.31	8.45	8.5	0.0	28.31	8.94	9.0	0.0	28.31	8.49	8.5	0.0	28.31	8.80	8.8	0.0
28.58	8.50	8.5	0.0	28.58	8.98	9.0	0.0	28.58	8.51	8.5	0.0	28.58	8.82	8.8	0.0
28.85	8.58	8.5	0.0	28.85	9.10	9.0	0.1	28.85	8.55	8.6	0.0	28.85	8.86	8.9	0.0
29.11	8.54	8.6	0.0	29.11	9.07	9.0	0.0	29.11	8.60	8.6	0.0	29.11	8.91	8.9	0.0
29.38	8.60	8.6	0.0	29.38	9.11	9.1	0.0	29.38	8.64	8.6	0.0	29.38	8.94	8.9	0.0
29.64	8.67	8.6	0.0	29.64	9.11	9.1	0.0	29.64	8.68	8.7	0.0	29.64	8.96	8.9	0.0
29.91	8.65	8.7	0.0	29.91	9.10	9.1	0.0	29.91	8.71	8.7	0.0	29.91	8.97	9.0	0.0
30.18	8.80	8.7	0.1	30.18	9.15	9.1	0.0	30.18	8.74	8.7	0.0	30.18	9.02	9.0	0.0
30.44	8.83	8.8	0.1	30.44	9.19	9.2	0.0	30.44	8.79	8.8	0.0	30.44	9.05	9.0	0.0
30.71	8.77	8.8	0.0	30.71	9.18	9.2	0.0	30.71	8.83	8.8	0.0	30.71	9.07	9.1	0.0
30.98	8.84	8.8	0.0	30.98	9.15	9.2	-0.1	30.98	8.85	8.8	0.0	30.98	9.02	9.1	-0.1
31.25	8.82	8.9	0.0	31.25	9.18	9.2	-0.1	31.25	8.93	8.9	0.1	31.25	9.05	9.1	-0.1
31.51	8.85	8.9	0.0	31.51	9.19	9.3	-0.1	31.51	8.94	8.9	0.0	31.51	9.11	9.1	0.0
31.78	8.86	8.9	-0.1	31.78	9.20	9.3	-0.1	31.78	8.92	8.9	0.0	31.78	9.15	9.2	0.0
32.04	8.90	8.9	0.0	32.04	9.31	9.3	0.0	32.04	8.96	9.0	0.0	32.04	9.17	9.2	0.0
32.31	9.01	9.0	0.0	32.31	9.31	9.3	0.0	32.31	8.98	9.0	0.0	32.31	9.21	9.2	0.0
32.58	8.95	9.0	-0.1	32.58	9.40	9.4	0.0	32.58	9.00	9.0	0.0	32.58	9.23	9.3	0.0
32.85	9.02	9.0	0.0	32.85	9.33	9.4	-0.1	32.85	9.05	9.1	0.0	32.85	9.26	9.3	0.0
33.11	9.12	9.1	0.0	33.11	9.36	9.4	-0.1	33.11	9.07	9.1	0.0	33.11	9.31	9.3	0.0
33.38	9.06	9.1	0.0	33.38	9.39	9.4	0.0	33.38	9.10	9.1	0.0	33.38	9.34	9.3	0.0
33.64	9.19	9.1	0.1	33.64	9.44	9.5	0.0	33.64	9.15	9.1	0.0	33.64	9.33	9.4	0.0
33.91	9.13	9.2	0.0	33.91	9.47	9.5	0.0	33.91	9.18	9.2	0.0	33.91	9.41	9.4	0.0
34.18	9.27	9.2	0.1	34.18	9.57	9.5	0.1	34.18	9.21	9.2	0.0	34.18	9.39	9.4	0.0
34.45	9.29	9.2	0.1	34.45	9.53	9.5	0.0	34.45	9.21	9.2	0.0	34.45	9.42	9.4	0.0
34.71	9.28	9.2	0.0	34.71	9.58	9.5	0.0	34.71	9.24	9.3	0.0	34.71	9.43	9.5	0.0
34.98	9.30	9.3	0.0	34.98	9.58	9.6	0.0	34.98	9.29	9.3	0.0	34.98	9.51	9.5	0.0
35.25	9.22	9.3	-0.1	35.25	9.66	9.6	0.1	35.25	9.30	9.3	0.0	35.25	9.53	9.5	0.0
35.51	9.34	9.3	0.0	35.51	9.60	9.6	0.0	35.51	9.34	9.3	0.0	35.51	9.53	9.5	0.0
35.78	9.32	9.4	0.0	35.78	9.70	9.6	0.1	35.78	9.36	9.4	0.0	35.78	9.52	9.5	0.0
36.04	9.33	9.4	-0.1	36.04	9.85	9.7	0.2	36.04	9.38	9.4	0.0	36.04	9.60	9.6	0.0
36.31	9.38	9.4	0.0	36.31	9.79	9.7	0.1	36.31	9.41	9.4	0.0	36.31	9.58	9.6	0.0
36.58	9.38	9.4	-0.1	36.58	9.74	9.7	0.0	36.58	9.46	9.4	0.0	36.58	9.61	9.6	0.0
36.85	9.54	9.5	0.1	36.85	9.74	9.7	0.0	36.85	9.45	9.5	0.0	36.85	9.64	9.6	0.0
37.11	9.50	9.5	0.0	37.11	9.79	9.7	0.1	37.11	9.48	9.5	0.0	37.11	9.69	9.7	0.0
37.38	9.52	9.5	0.0	37.38	9.81	9.8	0.1	37.38	9.50	9.5	0.0	37.38	9.70	9.7	0.0
37.64	9.53	9.5	0.0	37.64	9.84	9.8	0.1	37.64	9.54	9.5	0.0	37.64	9.67	9.7	0.0
37.91	9.65	9.6	0.1	37.91	9.76	9.8	0.0	37.91	9.57	9.6	0.0	37.91	9.68	9.7	0.0
38.18	9.63	9.6	0.0	38.18	9.84	9.8	0.0	38.18	9.58	9.6	0.0	38.18	9.75	9.7	0.0
38.45	9.67	9.6	0.1	38.45	9.78	9.8	0.0	38.45	9.61	9.6	0.0	38.45	9.78	9.8	0.0
38.71	9.73	9.6	0.1	38.71	9.82	9.8	0.0	38.71	9.62	9.6	0.0	38.71	9.75	9.8	0.0
38.98	9.63	9.7	0.0	38.98	9.91	9.9	0.0	38.98	9.64	9.7	0.0	38.98	9.74	9.8	-0.1
39.25	9.58	9.7	-0.1	39.25	9.88	9.9	0.0	39.25	9.66	9.7	0.0	39.25	9.82	9.8	0.0
39.51	9.66	9.7	0.0	39.51	9.94	9.9	0.0	39.51	9.69	9.7	0.0	39.51	9.82	9.8	0.0
39.78	9.66	9.7	-0.1	39.78	9.97	9.9	0.1	39.78	9.71	9.7	0.0	39.78	9.85	9.9	0.0
40.04	9.71	9.8	0.0	40.04	9.99	9.9	0.1	40.04	9.73	9.7	0.0	40.04	9.88	9.9	0.0
40.31	9.76	9.8	0.0	40.31	9.96	10.0	0.0	40.31	9.78	9.8	0.0	40.31	9.88	9.9	0.0
40.58	9.86	9.8	0.1	40.58	10.00	10.0	0.0	40.58	9.79	9.8	0.0	40.58	9.92	9.9	0.0
40.85	9.83	9.8	0.0	40.85	9.98	10.0	0.0	40.85	9.79	9.8	0.0	40.85	9.92	9.9	0.0
41.11	9.78	9.8	-0.1	41.11	10.00	10.0	0.0	41.11	9.83	9.8	0.0	41.11	9.93	10.0	0.0
41.38	9.82	9.9	0.0	41.38	10.05	10.0	0.0	41.38	9.88	9.9	0.0	41.38	9.91	10.0	-0.1

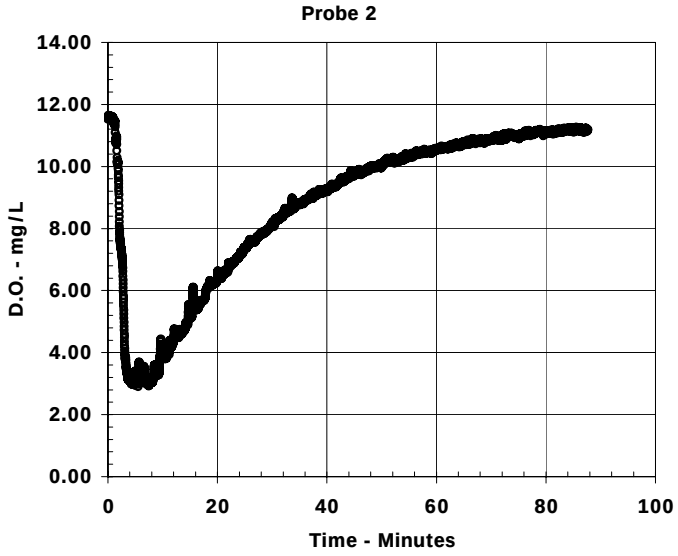
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	0.78	0.78		C0	3.21	3.21		C0	0.99	0.99		C0	2.32	2.32	
Kla-in	2.58	2.58		Kla-in	2.51	2.51		Kla-in	2.58	2.58		Kla-in	2.55	2.55	
C*	11.70	11.70		C*	11.49	11.49		C*	11.66	11.66		C*	11.56	11.56	
Sq.Diff.	1.0700			Sq.Diff.	2.9772			Sq.Diff.	0.1171			Sq.Diff.	0.2961		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
41.64	9.87	9.9	0.0	41.64	9.95	10.0	-0.1	41.64	9.85	9.9	0.0	41.64	9.91	10.0	-0.1
41.91	9.83	9.9	-0.1	41.91	10.03	10.1	0.0	41.91	9.89	9.9	0.0	41.91	9.99	10.0	0.0
42.18	9.89	9.9	0.0	42.18	10.16	10.1	0.1	42.18	9.89	9.9	0.0	42.18	10.00	10.0	0.0
42.45	9.95	9.9	0.0	42.45	10.16	10.1	0.1	42.45	9.94	9.9	0.0	42.45	10.04	10.0	0.0
42.71	9.97	10.0	0.0	42.71	10.24	10.1	0.1	42.71	9.98	10.0	0.0	42.71	10.06	10.1	0.0
42.98	10.09	10.0	0.1	42.98	10.21	10.1	0.1	42.98	9.99	10.0	0.0	42.98	10.08	10.1	0.0
43.25	10.14	10.0	0.1	43.25	10.14	10.1	0.0	43.25	10.00	10.0	0.0	43.25	10.13	10.1	0.0
43.51	10.05	10.0	0.0	43.51	10.24	10.1	0.1	43.51	10.02	10.0	0.0	43.51	10.13	10.1	0.0
43.78	10.08	10.0	0.0	43.78	10.26	10.2	0.1	43.78	10.03	10.0	0.0	43.78	10.11	10.1	0.0
44.04	10.03	10.1	0.0	44.04	10.10	10.2	-0.1	44.04	10.04	10.0	0.0	44.04	10.15	10.1	0.0
44.31	10.08	10.1	0.0	44.31	10.24	10.2	0.0	44.31	10.06	10.1	0.0	44.31	10.14	10.2	0.0
44.58	10.02	10.1	-0.1	44.58	10.20	10.2	0.0	44.58	10.10	10.1	0.0	44.58	10.15	10.2	0.0
44.85	10.13	10.1	0.0	44.85	10.18	10.2	0.0	44.85	10.12	10.1	0.0	44.85	10.20	10.2	0.0
45.11	10.14	10.1	0.0	45.11	10.20	10.2	0.0	45.11	10.13	10.1	0.0	45.11	10.22	10.2	0.0
45.38	10.21	10.2	0.1	45.38	10.32	10.2	0.1	45.38	10.13	10.1	0.0	45.38	10.20	10.2	0.0
45.64	10.18	10.2	0.0	45.64	10.21	10.3	-0.1	45.64	10.15	10.2	0.0	45.64	10.24	10.2	0.0
45.91	10.21	10.2	0.0	45.91	10.27	10.3	0.0	45.91	10.15	10.2	0.0	45.91	10.25	10.3	0.0
46.18	10.15	10.2	-0.1	46.18	10.34	10.3	0.1	46.18	10.18	10.2	0.0	46.18	10.25	10.3	0.0
46.45	10.36	10.2	0.1	46.45	10.32	10.3	0.0	46.45	10.21	10.2	0.0	46.45	10.26	10.3	0.0
46.71	10.31	10.2	0.1	46.71	10.32	10.3	0.0	46.71	10.22	10.2	0.0	46.71	10.28	10.3	0.0
46.98	10.30	10.3	0.0	46.98	10.35	10.3	0.0	46.98	10.23	10.2	0.0	46.98	10.31	10.3	0.0
47.25	10.27	10.3	0.0	47.25	10.35	10.3	0.0	47.25	10.24	10.3	0.0	47.25	10.36	10.3	0.0
47.51	10.28	10.3	0.0	47.51	10.42	10.4	0.1	47.51	10.25	10.3	0.0	47.51	10.33	10.3	0.0
47.78	10.33	10.3	0.0	47.78	10.36	10.4	0.0	47.78	10.30	10.3	0.0	47.78	10.37	10.4	0.0
48.04	10.42	10.3	0.1	48.04	10.50	10.4	0.1	48.04	10.29	10.3	0.0	48.04	10.34	10.4	0.0
48.31	10.40	10.3	0.1	48.31	10.41	10.4	0.0	48.31	10.34	10.3	0.0	48.31	10.37	10.4	0.0
48.58	10.43	10.4	0.1	48.58	10.47	10.4	0.1	48.58	10.36	10.3	0.0	48.58	10.41	10.4	0.0
48.85	10.48	10.4	0.1	48.85	10.44	10.4	0.0	48.85	10.35	10.3	0.0	48.85	10.38	10.4	0.0
49.11	10.42	10.4	0.0	49.11	10.45	10.4	0.0	49.11	10.39	10.4	0.0	49.11	10.39	10.4	0.0
49.38	10.42	10.4	0.0	49.38	10.48	10.4	0.0	49.38	10.39	10.4	0.0	49.38	10.42	10.4	0.0
49.64	10.54	10.4	0.1	49.64	10.46	10.5	0.0	49.64	10.41	10.4	0.0	49.64	10.38	10.4	-0.1
49.91	10.44	10.4	0.0	49.91	10.46	10.5	0.0	49.91	10.43	10.4	0.0	49.91	10.47	10.5	0.0
50.18	10.44	10.4	0.0	50.18	10.48	10.5	0.0	50.18	10.43	10.4	0.0	50.18	10.49	10.5	0.0
50.45	10.42	10.5	0.0	50.45	10.52	10.5	0.0	50.45	10.45	10.4	0.0	50.45	10.43	10.5	-0.1
50.71	10.51	10.5	0.0	50.71	10.45	10.5	0.0	50.71	10.49	10.4	0.0	50.71	10.44	10.5	-0.1
50.98	10.50	10.5	0.0	50.98	10.50	10.5	0.0	50.98	10.47	10.5	0.0	50.98	10.42	10.5	-0.1
51.25	10.53	10.5	0.0	51.25	10.51	10.5	0.0	51.25	10.47	10.5	0.0	51.25	10.49	10.5	0.0
51.51	10.54	10.5	0.0	51.51	10.53	10.5	0.0	51.51	10.49	10.5	0.0	51.51	10.49	10.5	0.0
51.78	10.43	10.5	-0.1	51.78	10.57	10.5	0.0	51.78	10.51	10.5	0.0	51.78	10.54	10.5	0.0
52.04	10.52	10.5	0.0	52.04	10.56	10.5	0.0	52.04	10.52	10.5	0.0	52.04	10.57	10.6	0.0
52.31	10.55	10.6	0.0	52.31	10.59	10.6	0.0	52.31	10.52	10.5	0.0	52.31	10.55	10.6	0.0
52.58	10.67	10.6	0.1	52.58	10.56	10.6	0.0	52.58	10.55	10.5	0.0	52.58	10.57	10.6	0.0
52.85	10.48	10.6	-0.1	52.85	10.60	10.6	0.0	52.85	10.58	10.6	0.0	52.85	10.59	10.6	0.0
53.11	10.59	10.6	0.0	53.11	10.62	10.6	0.0	53.11	10.57	10.6	0.0	53.11	10.60	10.6	0.0
53.38	10.63	10.6	0.0	53.38	10.59	10.6	0.0	53.38	10.57	10.6	0.0	53.38	10.63	10.6	0.0
53.64	10.55	10.6	-0.1	53.64	10.60	10.6	0.0	53.64	10.59	10.6	0.0	53.64	10.64	10.6	0.0
53.91	10.61	10.6	0.0	53.91	10.58	10.6	0.0	53.91	10.60	10.6	0.0	53.91	10.64	10.6	0.0
54.18	10.54	10.6	-0.1	54.18	10.64	10.6	0.0	54.18	10.63	10.6	0.0	54.18	10.62	10.6	0.0
54.45	10.59	10.7	-0.1	54.45	10.67	10.6	0.0	54.45	10.64	10.6	0.0	54.45	10.64	10.7	0.0
54.71	10.66	10.7	0.0	54.71	10.63	10.6	0.0	54.71	10.66	10.6	0.0	54.71	10.68	10.7	0.0
54.98	10.76	10.7	0.1	54.98	10.69	10.7	0.0	54.98	10.66	10.7	0.0	54.98	10.68	10.7	0.0
55.25	10.70	10.7	0.0	55.25	10.73	10.7	0.1	55.25	10.68	10.7	0.0	55.25	10.71	10.7	0.0
55.51	10.65	10.7	0.0	55.51	10.68	10.7	0.0	55.51	10.69	10.7	0.0	55.51	10.68	10.7	0.0
55.78	10.74	10.7	0.0	55.78	10.70	10.7	0.0	55.78	10.71	10.7	0.0	55.78	10.71	10.7	0.0
56.04	10.70	10.7	0.0	56.04	10.67	10.7	0.0	56.04	10.70	10.7	0.0	56.04	10.73	10.7	0.0
56.31	10.74	10.7	0.0	56.31	10.66	10.7	0.0	56.31	10.71	10.7	0.0	56.31	10.76	10.7	0.0
56.58	10.63	10.7	-0.1	56.58	10.77	10.7	0.1	56.58	10.73	10.7	0.0	56.58	10.73	10.7	0.0
57.11	10.66	10.8	-0.1	57.11	10.71	10.7	0.0	57.11	10.75	10.7	0.0	57.11	10.77	10.7	0.0
57.64	10.65	10.8	-0.1	57.64	10.80	10.7	0.1	57.64	10.77	10.8	0.0	57.64	10.80	10.8	0.0
58.18	10.88	10.8	0.1	58.18	10.83	10.8	0.1	58.18	10.78	10.8	0.0	58.18	10.85	10.8	0.1
58.71	10.92	10.8	0.1	58.71	10.80	10.8	0.0	58.71	10.81	10.8	0.0	58.71	10.85	10.8	0.0
59.25	10.91	10.8	0.1	59.25	10.81	10.8	0.0	59.25	10.83	10.8	0.0	59.25	10.85	10.8	0.0
59.78	10.91	10.9	0.0	59.78	10.82	10.8	0.0	59.78	10.84	10.8	0.0	59.78	10.82	10.8	0.0
60.31	10.85	10.9	0.0	60.31	10.82	10.8	0.0	60.31	10.87	10.9	0.0	60.31	10.87	10.9	0.0
60.85	10.87	10.9	0.0	60.85	10.84	10.8	0.0	60.85	10.87	10.9	0.0	60.85	10.89	10.9	0.0
61.38	10.81	10.9	-0.1	61.38	10.85	10.9	0.0	61.38	10.90	10.9	0.0	61.38	10.92	10.9	0.0
61.91	10.85	10.9	-0.1	61.91	10.87	10.9	0.0	61.91	10.91	10.9	0.0	61.91	10.92	10.9	0.0
62.45	10.92	11.0	0.0	62.45	10.91	10.9	0.0	62.45	10.94	10.9	0.0	62.45	10.93	10.9	0.0
62.98	10.96	11.0	0.0	62.98	10.89	10.9	0.0	62.98	10.95	10.9	0.0	62.98	10.95	10.9	0.0
63.51	11.00	11.0	0.0	63.51	10.94	10.9	0.0	63.51	10.96	11.0	0.0	63.51	10.98	10.9	0.0
64.04	11.00	11.0	0.0	64.04	11.00	10.9	0.1	64.04	10.98	11.0	0.0	64.04	10.98	11.0	0.0
64.58	11.04	11.0	0.0	64.58	10.97	10.9	0.0	64.58	11.01	11.0	0.0	64.58	10.99	11.0	0.0
65.11	11.06	11.0	0.0	65.11	11.00	10.9	0.1	65.11	11.02	11.0	0.0	65.11	11.01	11.0	0.0
65.65	11.12	11.1	0.1	65.65	10.98	11.0	0.0	65.65	11.04	11.0	0.0	65.65	10.98	11.0	0.0
66.18	10.96	11.1	-0.1	66.18	10.95	11.0	0.0	66.18	11.04	11.0	0.0	66.18	10.98	11.0	0.0
66.71	11.11	11.1	0.0	66.71	10.93	11.0	-0.1	66.71	11.04	11.0	0.0	66.71	11.03	11.0	0.0
67.25	11.10	11.1	0.0	67.25	11.03	11.0	0.0	67.25	11.06	11.1	0.0	67.25	11.06	11.0	0.0
67.78	11.07	11.1	0.0	67.78	11.04	11.0	0.0	67.78	11.08	11.1	0.0	67.78	11.08	11.0	0.0

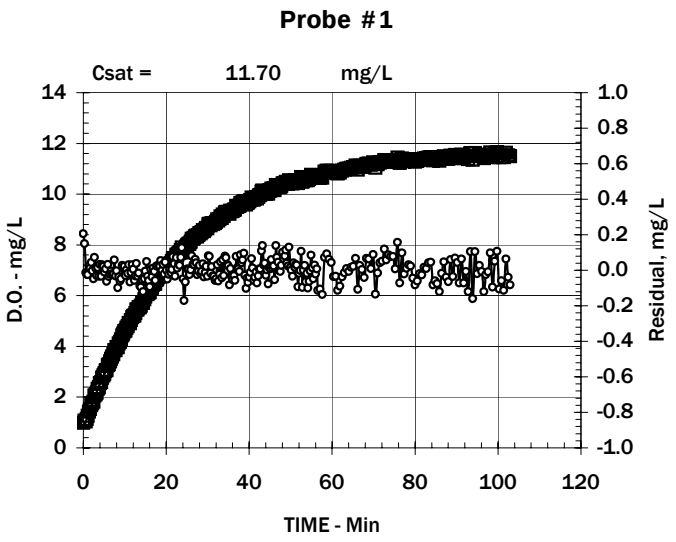
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	0.78	0.78		C0	3.21	3.21		C0	0.99	0.99		C0	2.32	2.32	
Kla-in	2.58	2.58		Kla-in	2.51	2.51		Kla-in	2.58	2.58		Kla-in	2.55	2.55	
C*	11.70	11.70		C*	11.49	11.49		C*	11.66	11.66		C*	11.56	11.56	
Sq.Diff.	1.0700			Sq.Diff.	2.9772			Sq.Diff.	0.1171			Sq.Diff.	0.2961		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
68.31	11.19	11.1	0.1	68.31	11.01	11.0	0.0	68.31	11.10	11.1	0.0	68.31	11.07	11.1	0.0
68.84	11.20	11.1	0.1	68.84	11.05	11.0	0.0	68.84	11.12	11.1	0.0	68.84	11.11	11.1	0.0
69.38	11.16	11.2	0.0	69.38	11.07	11.0	0.0	69.38	11.15	11.1	0.0	69.38	11.13	11.1	0.1
69.91	11.25	11.2	0.1	69.91	11.10	11.0	0.1	69.91	11.15	11.1	0.0	69.91	11.10	11.1	0.0
70.45	11.04	11.2	-0.1	70.45	11.15	11.1	0.1	70.45	11.17	11.1	0.0	70.45	11.12	11.1	0.0
70.98	11.17	11.2	0.0	70.98	11.14	11.1	0.1	70.98	11.19	11.2	0.0	70.98	11.09	11.1	0.0
71.51	11.24	11.2	0.0	71.51	11.05	11.1	0.0	71.51	11.16	11.2	0.0	71.51	11.10	11.1	0.0
72.04	11.26	11.2	0.1	72.04	11.08	11.1	0.0	72.04	11.18	11.2	0.0	72.04	11.16	11.1	0.0
72.58	11.34	11.2	0.1	72.58	11.12	11.1	0.0	72.58	11.21	11.2	0.0	72.58	11.17	11.1	0.0
73.11	11.29	11.2	0.1	73.11	11.10	11.1	0.0	73.11	11.22	11.2	0.0	73.11	11.17	11.2	0.0
73.65	11.33	11.2	0.1	73.65	11.16	11.1	0.1	73.65	11.20	11.2	0.0	73.65	11.21	11.2	0.1
74.18	11.33	11.3	0.1	74.18	11.13	11.1	0.0	74.18	11.22	11.2	0.0	74.18	11.24	11.2	0.1
74.71	11.34	11.3	0.1	74.71	11.14	11.1	0.0	74.71	11.24	11.2	0.0	74.71	11.23	11.2	0.1
75.25	11.28	11.3	0.0	75.25	11.12	11.1	0.0	75.25	11.25	11.2	0.0	75.25	11.25	11.2	0.1
75.78	11.44	11.3	0.2	75.78	11.22	11.1	0.1	75.78	11.26	11.2	0.0	75.78	11.26	11.2	0.1
76.31	11.22	11.3	-0.1	76.31	11.20	11.1	0.1	76.31	11.28	11.3	0.0	76.31	11.25	11.2	0.0
76.84	11.40	11.3	0.1	76.84	11.13	11.2	0.0	76.84	11.28	11.3	0.0	76.84	11.25	11.2	0.0
77.38	11.29	11.3	0.0	77.38	11.17	11.2	0.0	77.38	11.28	11.3	0.0	77.38	11.23	11.2	0.0
77.91	11.33	11.3	0.0	77.91	11.15	11.2	0.0	77.91	11.29	11.3	0.0	77.91	11.27	11.2	0.0
78.45	11.36	11.3	0.0	78.45	11.15	11.2	0.0	78.45	11.30	11.3	0.0	78.45	11.27	11.2	0.0
78.98	11.36	11.3	0.0	78.98	11.18	11.2	0.0	78.98	11.32	11.3	0.0	78.98	11.25	11.2	0.0
79.51	11.30	11.3	0.0	79.51	11.16	11.2	0.0	79.51	11.30	11.3	0.0	79.51	11.29	11.2	0.0
80.04	11.27	11.4	-0.1	80.04	11.24	11.2	0.0	80.04	11.31	11.3	0.0	80.04	11.27	11.3	0.0
80.58	11.30	11.4	-0.1	80.58	11.22	11.2	0.0	80.58	11.33	11.3	0.0	80.58	11.30	11.3	0.0
81.11	11.35	11.4	0.0	81.11	11.25	11.2	0.0	81.11	11.33	11.3	0.0	81.11	11.32	11.3	0.1
81.65	11.35	11.4	0.0	81.65	11.22	11.2	0.0	81.65	11.34	11.3	0.0	81.65	11.29	11.3	0.0
82.18	11.40	11.4	0.0	82.18	11.25	11.2	0.0	82.18	11.34	11.3	0.0	82.18	11.29	11.3	0.0
82.71	11.40	11.4	0.0	82.71	11.20	11.2	0.0	82.71	11.37	11.4	0.0	82.71	11.26	11.3	0.0
83.25	11.44	11.4	0.0	83.25	11.21	11.2	0.0	83.25	11.37	11.4	0.0	83.25	11.34	11.3	0.0
83.78	11.45	11.4	0.0	83.78	11.22	11.2	0.0	83.78	11.36	11.4	0.0	83.78	11.32	11.3	0.0
84.31	11.33	11.4	-0.1	84.31	11.21	11.2	0.0	84.31	11.38	11.4	0.0	84.31	11.28	11.3	0.0
84.84	11.36	11.4	-0.1	84.84	11.23	11.3	0.0	84.84	11.36	11.4	0.0	84.84	11.34	11.3	0.0
85.38	11.35	11.4	-0.1	85.38	11.35	11.3	0.1	85.38	11.39	11.4	0.0	85.38	11.37	11.3	0.1
85.91	11.31	11.4	-0.1	85.91	11.28	11.3	0.0	85.91	11.37	11.4	0.0	85.91	11.34	11.3	0.0
86.45	11.42	11.4	0.0	86.45	11.24	11.3	0.0	86.45	11.39	11.4	0.0	86.45	11.32	11.3	0.0
86.98	11.49	11.4	0.0	86.98	11.26	11.3	0.0	86.98	11.40	11.4	0.0	86.98	11.31	11.3	0.0
87.51	11.41	11.4	0.0	87.51	11.20	11.3	-0.1	87.51	11.38	11.4	0.0	87.51	11.26	11.3	-0.1
88.04	11.39	11.5	-0.1	88.04	11.25	11.3	0.0	88.04	11.41	11.4	0.0	88.04	11.33	11.3	0.0
88.58	11.52	11.5	0.1	88.58	11.22	11.3	-0.1	88.58	11.41	11.4	0.0	88.58	11.30	11.3	0.0
89.11	11.43	11.5	0.0	89.11	11.26	11.3	0.0	89.11	11.42	11.4	0.0	89.11	11.32	11.4	0.0
89.65	11.54	11.5	0.1	89.65	11.29	11.3	0.0	89.65	11.42	11.4	0.0	89.65	11.34	11.4	0.0
90.18	11.52	11.5	0.0	90.18	11.30	11.3	0.0	90.18	11.42	11.4	0.0	90.18	11.24	11.4	-0.1
90.71	11.41	11.5	-0.1	90.71	11.24	11.3	-0.1	90.71	11.42	11.4	0.0	90.71	11.33	11.4	0.0
91.25	11.55	11.5	0.1	91.25	11.27	11.3	0.0	91.25	11.44	11.4	0.0	91.25	11.35	11.4	0.0
91.78	11.42	11.5	-0.1	91.78	11.24	11.3	-0.1	91.78	11.46	11.4	0.0	91.78	11.36	11.4	0.0
92.31	11.49	11.5	0.0	92.31	11.23	11.3	-0.1	92.31	11.41	11.5	0.0	92.31	11.35	11.4	0.0
92.84	11.38	11.5	-0.1	92.84	11.24	11.3	-0.1	92.84	11.45	11.5	0.0	92.84	11.39	11.4	0.0
93.38	11.61	11.5	0.1	93.38	11.29	11.3	0.0	93.38	11.46	11.5	0.0	93.38	11.38	11.4	0.0
93.91	11.35	11.5	-0.2	93.91	11.26	11.3	-0.1	93.91	11.44	11.5	0.0	93.91	11.38	11.4	0.0
94.45	11.62	11.5	0.1	94.45	11.29	11.3	0.0	94.45	11.45	11.5	0.0	94.45	11.40	11.4	0.0
94.98	11.50	11.5	0.0	94.98	11.27	11.3	-0.1	94.98	11.46	11.5	0.0	94.98	11.38	11.4	0.0
95.51	11.55	11.5	0.0	95.51	11.33	11.3	0.0	95.51	11.48	11.5	0.0	95.51	11.40	11.4	0.0
96.04	11.52	11.5	0.0	96.04	11.27	11.3	-0.1	96.04	11.50	11.5	0.0	96.04	11.38	11.4	0.0
96.58	11.41	11.5	-0.1	96.58	11.28	11.3	-0.1	96.58	11.46	11.5	0.0	96.58	11.41	11.4	0.0
97.11	11.51	11.5	0.0	97.11	11.27	11.3	-0.1	97.11	11.49	11.5	0.0	97.11	11.43	11.4	0.0
97.65	11.53	11.5	0.0	97.65	11.31	11.4	0.0	97.65	11.50	11.5	0.0	97.65	11.46	11.4	0.0
98.18	11.64	11.5	0.1	98.18	11.38	11.4	0.0	98.18	11.48	11.5	0.0	98.18	11.47	11.4	0.0
98.71	11.45	11.5	-0.1	98.71	11.28	11.4	-0.1	98.71	11.46	11.5	0.0	98.71	11.44	11.4	0.0
99.25	11.60	11.5	0.1	99.25	11.38	11.4	0.0	99.25	11.49	11.5	0.0	99.25	11.38	11.4	0.0
99.78	11.66	11.6	0.1	99.78	11.38	11.4	0.0	99.78	11.47	11.5	0.0	99.78	11.31	11.4	-0.1
100.31	11.45	11.6	-0.1	100.31	11.36	11.4	0.0	100.31	11.49	11.5	0.0	100.31	11.32	11.4	-0.1
100.84	11.50	11.6	-0.1	100.84	11.26	11.4	-0.1	100.84	11.46	11.5	-0.1	100.84	11.39	11.4	0.0
101.38	11.45	11.6	-0.1	101.38	11.32	11.4	-0.1	101.38	11.49	11.5	0.0	101.38	11.40	11.4	0.0
101.91	11.63	11.6	0.1	101.91	11.27	11.4	-0.1	101.91	11.51	11.5	0.0	101.91	11.42	11.4	0.0
102.45	11.53	11.6	0.0	102.45	11.23	11.4	-0.1	102.45	11.51	11.5	0.0	102.45	11.46	11.4	0.0
102.98	11.49	11.6	-0.1	102.98	11.30	11.4	-0.1	102.98	11.49	11.5	0.0	102.98	11.32	11.4	-0.1

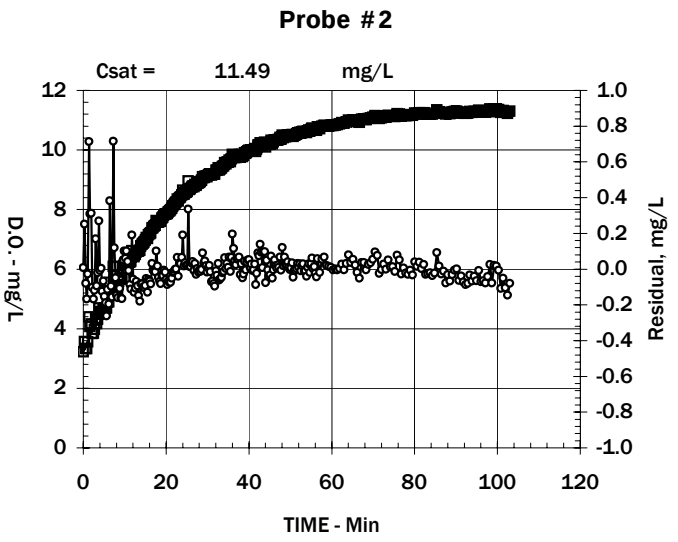
	Probe 1				Probe 2				Probe 3				Probe 4		
Lower	8.37%			Lower	28.02%			Lower	8.58%			Lower	20.76%		
Upper	99.63%			Upper	99.03%			Upper	98.75%			Upper	99.20%		
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE
C*	11.703	0.009	0.076	C*	11.491	0.015	0.133	C*	11.656	0.003	0.025	C*	11.563	0.005	0.041
C0	0.775	0.014	1.816	C0	3.212	0.023	0.724	C0	0.991	0.005	0.470	C0	2.324	0.007	0.318
KLaT	2.581	0.000	0.307	KLaT	2.506	0.000	0.683	KLaT	2.578	0.000	0.104	KLaT	2.551	0.000	0.192
Error	0.060			Error	0.100			Error	0.020			Error	0.032		

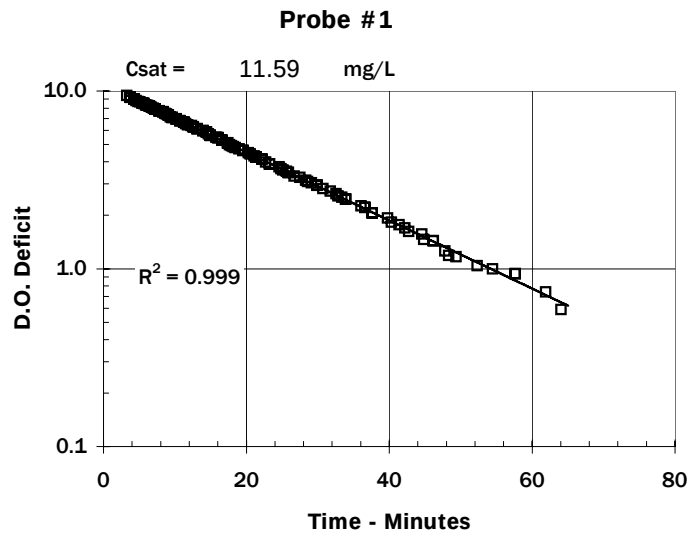
PROJECT: PHi - Membrane Tube Diffusers + PHi Pumping
DATE: 11/8/2006
RUN: 3.00

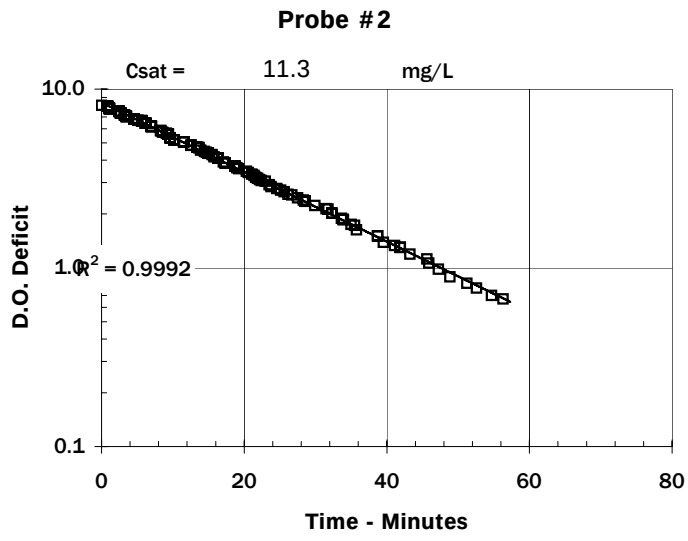




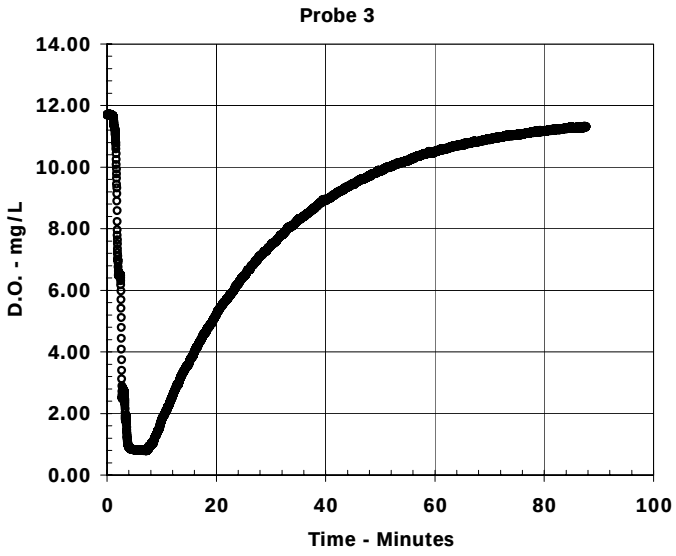


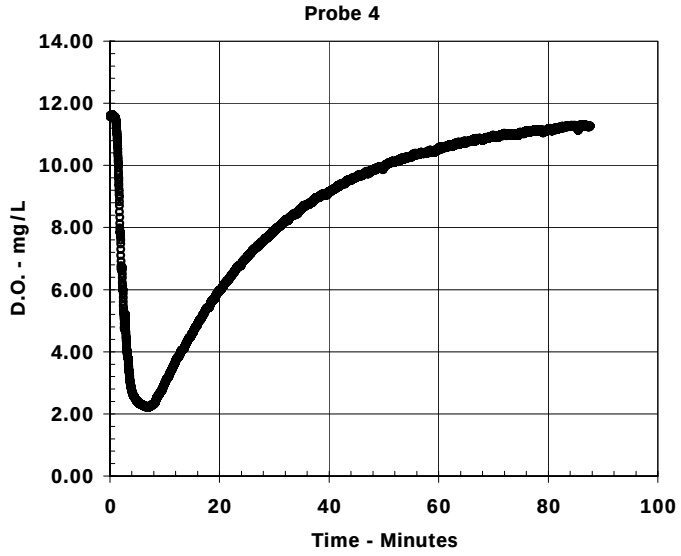


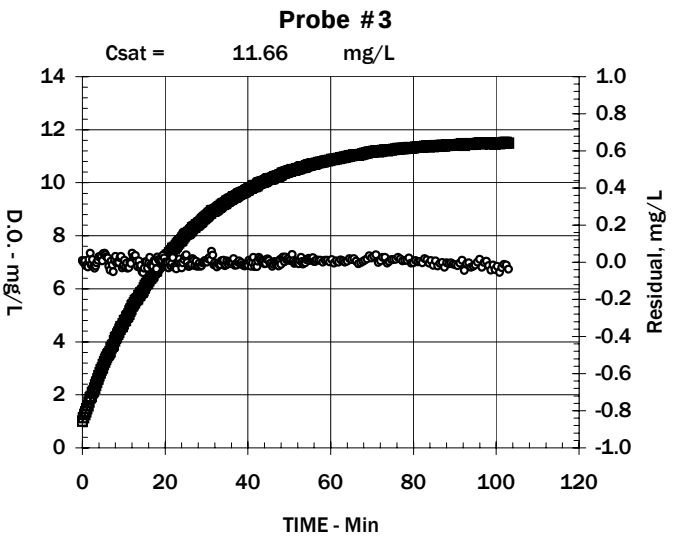


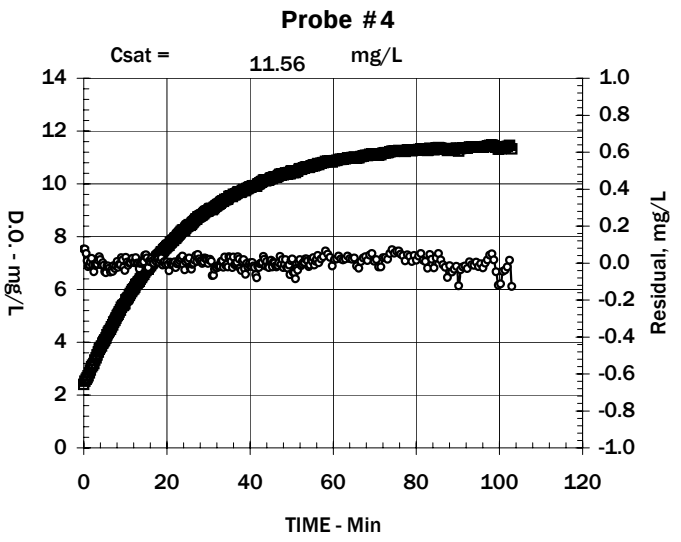


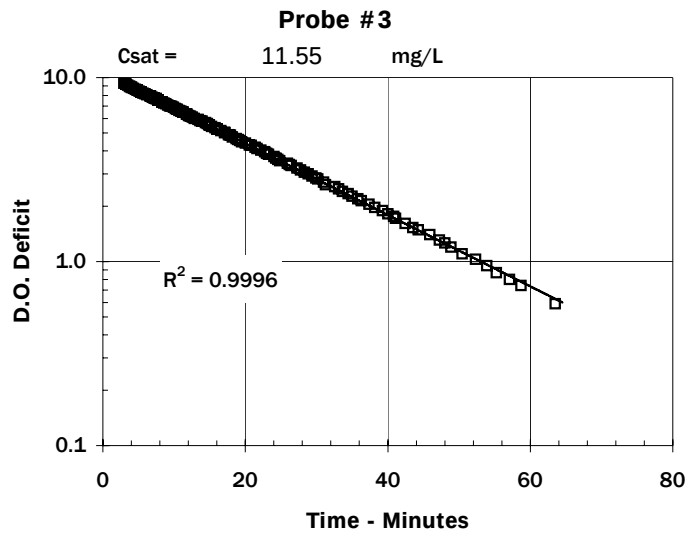
Project: PHi - Membrane Tube Diffusers + PHi Pumping
Date: Nov 08, 2006
Run: 3

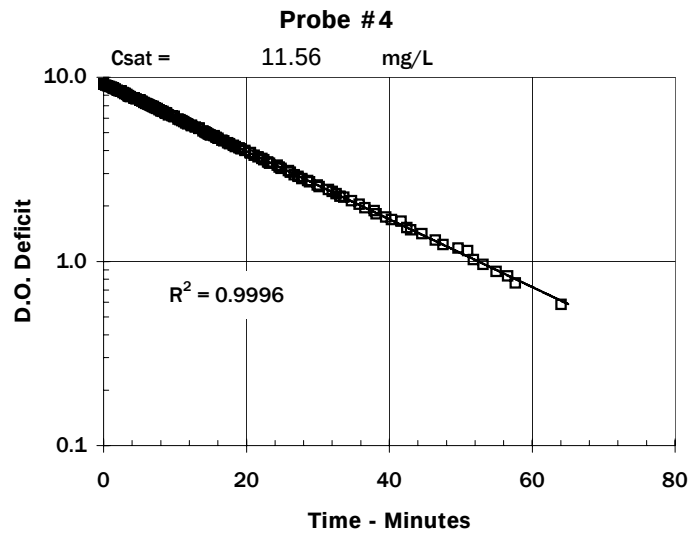












Project: PHi - Membrane Tube Diffusers + PHi Pumping
Date: Nov 08, 2006
Run: 3

AIR FLOW RATE DETERMINATION
ANR 73 COMMERCIAL ANNUBAR - Diffused Air System

PROJECT : PHi - Membrane Tube Diffusers + PHi Pumping

SCFM = $C'' \sqrt{\dfrac{[BP + LP]}{[LT + 460]}}$

C' = Fna * k * D^2 * Fra * Fpb * Ftb * Fg * Fpv * Faa * Fl * Fm * Ya

C'' = C' VALUE CORRECTED FOR HUMIDITY

RUN	#		**3**	
DATE			Nov-06	
OPERATING CONDITIONS			AWR-73	
ANNUBAR TYPE			2	
BAROMETRIC PRESSURE	* **BP**		14.18	PSIA
LINE PRESSURE	* **LP**		8.87	PSIG
LINE TEMPERATURE	* **LT**		136	°F
DIFFERENTIAL PRESSURE	* **^H**		0.02	In. H2O
RELATIVE HUMIDITY	* **RH**		64%	%
AMBIENT TEMPERATURE	*	**15.5**	64	°F
PIPE INSIDE DIAMETER	* **D**		4.026	In.
UNITS CONVERSION FACTOR	**Fna**		128.520	
ANNUBAR FLOW COEFFICIENT	**k**		0.746	
SQUARE OF PIPE ID	**D^2**		16.209	
BASE PRESSURE			14.700	PSIA
BASE PRESSURE FACTOR	**Fpb**		1.002	
BASE TEMPERATURE			68.000	°F
BASE TEMPERATURE FACTOR	**Ftb**		1.015	
THERMAL EXPANSION FACTOR	**Faa**		1.002	
MANOMETER LOCATION FACTOR	**Fl**		1.000	
HG MANOMETER CORRECTION FACTOR	**Fm**		1.000	
REYNOLD NUMBER	**Rd**		14,610.3	
FLOWING VICOSITY	**vis**		0.020	cP
REYNOLD NUMBER FACTOR	**Fra**		0.965	
SPECIFIC GRAVITY	**g**		1.000	
SPECIFIC GRAVITY FACTOR	**Fg**		1.000	
SUPERCOMPRESSIBILTY	**Z**		1.000	
SUPERCOMPRESSIBILTY FACTOR	**Fpv**		1.000	
GAS EXPANSION FACTOR	**Ya**		1.000	
SCFM UNCORRECTED FOR HUMIDITY	**SCFM**		40.3	
C'			1,527.70	
VAPOR PRESSURE OF WATER AMB. TEMP.	**VP**		0.301	
ACTUAL CUBIC FEET PER MINUTE	**ACFM**		29.0	328.2
HUMIDITY CORRECTED STANDARD AIR FLOW	**SCFM**		**40.1**	@68°F, 36% RH, 14.7 PSIA
INLET CUBIC FEET PER MINUTE	**ICFM**		**47.1**	
C''			**1,518.75**	

FORMULAS AND FACTORS DERIVED FROM: L.K.Spink; "Principles and Practice of FLOW METER ENGINEERING"; Ninth Ed., Nov 1975; The FOXBORO CO., Foxboro, Mass.
"ORIFICE FLOW METER"; THE BRISTOL COMPANY; Waterbury, Conn.
"ANNUBAR FLOW HANDBOOK"; August 1978; DIETERICH STANDARD CORPORATION; Boulder, Co.

HUMIDITY CORRECTED AIR FLOW DETERMINED per: "ASCE STANDARD Measurement of Oxygen Transfer in Clean Water";ANNEX A; July 1984; American Society of Civil Engineers

AIR FLOW RATE DETERMINATION
ANR 73 COMMERCIAL ANNUBAR - PHi Mixing System

PROJECT : PHi

SCFM = $C'' \sqrt{\frac{[BP + LP]}{[LT + 460]}}$

C' = Fna * k * D^2 * Fra * Fpb * Ftb * Fg * Fpv * Faa * Fl * Fm * Ya

C'' = C' VALUE CORRECTED FOR HUMIDITY

RUN # **3 (Est. PHi Additional O2 Provided)**

DATE Nov-06

OPERATING CONDITIONS				AWR-73	
ANNUBAR TYPE				2	
BAROMETRIC PRESSURE	*	**BP**		14.18	PSIA
LINE PRESSURE	*	**LP**		65.00	PSIG
LINE TEMPERATURE	*	**LT**		64	°F
DIFFERENTIAL PRESSURE	*	**^H**		0.01	In. H2O
RELATIVE HUMIDITY	*	**RH**		64%	%
AMBIENT TEMPERATURE	*		**15.5**	64	°F
PIPE INSIDE DIAMETER	*	**D**		4.026	In.
UNITS CONVERSION FACTOR		**Fna**		128.520	
ANNUBAR FLOW COEFFICIENT		**k**		0.746	
SQUARE OF PIPE ID		**D^2**		16.209	
BASE PRESSURE				14.700	PSIA
BASE PRESSURE FACTOR		**Fpb**		1.002	
BASE TEMPERATURE				68.000	°F
BASE TEMPERATURE FACTOR		**Ftb**		1.015	
THERMAL EXPANSION FACTOR		**Faa**		1.001	
MANOMETER LOCATION FACTOR		**Fl**		1.000	
HG MANOMETER CORRECTION FACTOR		**Fm**		1.000	
REYNOLD NUMBER		**Rd**		17,566.8	
FLOWING VICOSITY		**vis**		0.018	cP
REYNOLD NUMBER FACTOR		**Fra**		0.965	
SPECIFIC GRAVITY		**g**		1.000	
SPECIFIC GRAVITY FACTOR		**Fg**		1.000	
SUPERCOMPRESSIBILTY		**Z**		0.997	
SUPERCOMPRESSIBILTY FACTOR		**Fpv**		1.001	
GAS EXPANSION FACTOR		**Ya**		1.000	
SCFM UNCORRECTED FOR HUMIDITY		**SCFM**		43.9	
C'				1,527.74	
VAPOR PRESSURE OF WATER AMB. TEMP.		**VP**		0.301	
ACTUAL CUBIC FEET PER MINUTE		**ACFM**		8.1	91.5
HUMIDITY CORRECTED STANDARD AIR FLOW		**SCFM**		**43.6**	@68°F, 36% RH, 14.7 PSIA
INLET CUBIC FEET PER MINUTE		**ICFM**		**45.2**	
C''				**1,518.79**	

FORMULAS AND FACTORS DERIVED FROM: L.K.Spink; "Principles and Practice of FLOW METER ENGINEERING"; Ninth Ed., Nov 1975; The FOXBORO CO., Foxboro, Mass.
"ORIFICE FLOW METER"; THE BRISTOL COMPANY; Waterbury, Conn.
"ANNUBAR FLOW HANDBOOK"; August 1978; DIETERICH STANDARD CORPORATION; Boulder, Co.

HUMIDITY CORRECTED AIR FLOW DETERMINED per: "ASCE STANDARD Measurement of Oxygen Transfer in Clean Water";ANNEX A; July 1984; American Society of Civil Engineers

GSEE, Inc.

Environmental Services

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: PHi (Faster Valve Test)
DATE: 9-Nov-06
RUN: 4

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

	Initial	Mid Point	Final
Barometric Pres. (PSIA)	14.199	14.232	14.263
(mm Hg)	734.30	736.00	737.60
Ambient Temperature (°F)	73.90	67.90	61.90
Relative Humidity (%)	49%	57%	65%
Line Pressure (PSIG)	44.943	45.188	44.943
(In. Hg)	91.50	92.00	91.50
Line Temperature (°F)	73.90	67.90	61.90
ΔH Air Flow Dev. 1 (Annubar)	0.006	0.006	0.006
ΔH Air Flow Dev. 2 (Orifice)	0.205	0.205	0.205
ΔH Air Flow Dev. 3 (Annubar)	NA	NA	NA
ΔH Air Flow Dev. 4 (Annubar)	NA	NA	NA
Water Temp. (°C)	14.93	14.95	14.99
Orifice Diameter (in)		1.840	
Number Of Aeration Devices		1	
Side Water Depth (ft)		19.25	(5.85 m)
Air Release Depth (ft)		19.25	(5.85 m)
Tank Length (ft)		0.00	(0.00 m)
Tank Width (ft)		0.00	(0.00 m)
Tank Diameter (ft)		21.00	(6.38 m)
Gear Reducer or Belt Efficiency		100.0%	
Motor Efficiency		93.0%	
Total HP_{wire} av.		5.80	(4.33 kw)

C' Air Flow Device 1 (Annubar)	1,518.30
Air Flow Device 1 (SCFM)	38.07
C' Air Flow Device 2 (Orifce)	249.20
Air Flow Device 2 (SCFM)	37.80
Average Air Flow (SCFM)	37.93
Effective Depth Correction (f)	0.01
Headloss (In. H_2O)	1,015.35
C* (mg/l)	9.85
CsmT (Standard Methods, mg/l)	10.09
C^*_{20} Standard Conditions	9.16
Tank Volume (Ft³)	6,667.4
(Gallons)	49,875.9
(m³)	188.8
(Million Pounds)	0.416
#Na_2SO_3 @ 160% Stoichiometric	52
Cobalt Concen. (mg/l)	0.100
Grams Cobalt Chloride	77.9
Total HP_{motor} av.	5.40
TDS (mg/L)	676.00

NON-LINEAR REGRESSION RESULTS

Probe	K_{LaT}	K_{La20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Std. Err.
1	0.11	0.12	0.47	0.47	1.20	0.08	9.76	0.0852
2	0.11	0.13	0.47	0.47	1.20	0.08	9.71	0.0165
3	0.11	0.12	0.49	0.49	1.24	0.08	10.07	0.0089
4	0.11	0.12	0.47	0.47	1.20	0.08	9.86	0.0153
avg.	0.11	0.12	0.47	0.47	1.21	0.08	9.85	0.0315
Avg	*0.11*	*0.12*	*0.47*	*0.47*	*1.20*	*0.08*	*9.81*	Exclude Max&Min
TDS	***0.11***	***0.13***	***0.49***	***0.49***	***1.25***	***0.08***	***9.85***	***0.06%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-WHP		

OXYGEN TRANSFER

Total SCFM:	**37.9**	**60.987**	**:Nm³/Hr**	**17.903**	**L/s**	**#O2/Hr:**	**0.49**	**0.222**	**:KgO2/Hr**
SCFM/Diff.:	**37.93**	**60.987**	**:Nm³/hr/Diff**			**#O2/Hr/Diff.:**	**0.49**	**0.222**	**:KgO2/Hr/Diff.**
SCFM/KCF:	**5.7**	**0.323**	**:Nm³/hr/m³**			**#O2/Day:**	**11.7**	**5.3**	**:KgO2/Day**
Total ICFM:	**39.5**	**18.65**	**L/s**			**#O2/Day/1000 Ft³:**	**2**	**0.03**	**:KgO2/Day/m³**

LINEAR REGRESSION RESULTS

Probe	K_{LaT}	K_{La20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Corr.Coeff.
1	0.11	0.12	0.46	0.46	1.18	0.08	9.85	0.9990
2	0.11	0.12	0.46	0.46	1.16	0.08	9.87	0.9999
3	0.11	0.12	0.48	0.48	1.23	0.08	10.10	1.0000
4	0.11	0.12	0.47	0.47	1.20	0.08	9.86	0.9999
avg.	0.11	0.12	0.47	0.47	1.19	0.08	9.92	0.9997
Avg	*0.11*	*0.12*	*0.47*	*0.47*	*1.19*	*0.08*	*9.87*	Exclude Max&Min
TDS	***0.11***	***0.13***	***0.48***	***0.48***	***1.23***	***0.08***	***9.92***	
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-HPw		

EUROPEAN STANDARD

Probe	K_{LaT}	K_{La10}	SOTR	SOTR/Dev	SAE	C*
1	0.11	0.10	0.21	0.21	0.05	9.76
2	0.11	0.10	0.21	0.21	0.05	9.71
3	0.11	0.10	0.22	0.22	0.05	10.07
4	0.11	0.10	0.21	0.21	0.05	9.86
avg.	0.11	0.10	0.21	0.21	0.05	9.85
Avg	*0.11*	*0.10*	*0.21*	*0.21*	*0.05*	*9.81*
TDS	***0.11***	***0.10***	***0.22***	***0.22***	***0.05***	***9.85***
Corrected	/hr	/hr	kg O_2/hr		kg O_2/hr-kw	mg/L

Exclude Max&Min

Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.12	1.12		C0	1.29	1.29		C0	0.96	0.96		C0	1.15	1.15	
Kla-in	0.11	0.11		Kla-in	0.11	0.11		Kla-in	0.11	0.11		Kla-in	0.11	0.11	
C*	9.76	9.76		C*	9.71	9.71		C*	10.07	10.07		C*	9.86	9.86	
Sq.Diff.	2.1547			Sq.Diff.	0.0812			Sq.Diff.	0.0233			Sq.Diff.	0.0694		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	1.15	1.1	0.0	0.00	1.28	1.3	0.0	0.00	0.96	1.0	0.0	0.00	1.16	1.1	0.0
1.33	1.14	1.1	0.0	1.33	1.33	1.3	0.0	1.33	0.98	1.0	0.0	1.33	1.20	1.2	0.0
2.67	1.17	1.2	0.0	2.67	1.32	1.3	0.0	2.67	0.99	1.0	0.0	2.67	1.20	1.2	0.0
4.00	1.23	1.2	0.0	4.00	1.34	1.4	0.0	4.00	1.04	1.0	0.0	4.00	1.18	1.2	0.0
5.33	1.24	1.2	0.0	5.33	1.40	1.4	0.0	5.33	1.06	1.0	0.0	5.33	1.25	1.2	0.0
6.67	1.25	1.2	0.0	6.67	1.39	1.4	0.0	6.67	1.06	1.1	0.0	6.67	1.26	1.3	0.0
8.00	1.23	1.3	0.0	8.00	1.41	1.4	0.0	8.00	1.08	1.1	0.0	8.00	1.27	1.3	0.0
9.33	1.28	1.3	0.0	9.33	1.43	1.4	0.0	9.33	1.11	1.1	0.0	9.33	1.32	1.3	0.0
10.67	1.26	1.3	0.0	10.67	1.44	1.5	0.0	10.67	1.12	1.1	0.0	10.67	1.33	1.3	0.0
13.33	1.34	1.3	0.0	13.33	1.49	1.5	0.0	13.33	1.18	1.2	0.0	13.33	1.33	1.4	0.0
16.00	1.43	1.4	0.1	16.00	1.51	1.5	0.0	16.00	1.22	1.2	0.0	16.00	1.40	1.4	0.0
18.67	1.40	1.4	0.0	18.67	1.58	1.6	0.0	18.67	1.25	1.3	0.0	18.67	1.42	1.4	0.0
21.33	1.48	1.5	0.0	21.33	1.609	1.6	0.0	21.33	1.31	1.3	0.0	21.33	1.48	1.5	0.0
24.00	1.51	1.5	0.0	24.00	1.64	1.7	0.0	24.00	1.37	1.4	0.0	24.00	1.54	1.5	0.0
26.67	1.53	1.5	0.0	26.67	1.703	1.7	0.0	26.67	1.41	1.4	0.0	26.67	1.59	1.6	0.0
29.33	1.58	1.6	0.0	29.33	1.734	1.7	0.0	29.33	1.42	1.4	0.0	29.33	1.62	1.6	0.0
32.00	1.63	1.6	0.0	32.00	1.776	1.8	0.0	32.00	1.46	1.5	0.0	32.00	1.64	1.6	0.0
34.67	1.70	1.7	0.0	34.67	1.818	1.8	0.0	34.67	1.51	1.5	0.0	34.67	1.69	1.7	0.0
37.33	1.74	1.7	0.0	37.33	1.85	1.9	0.0	37.33	1.55	1.6	0.0	37.33	1.72	1.7	0.0
40.00	1.74	1.7	0.0	40.00	1.89	1.9	0.0	40.00	1.62	1.6	0.0	40.00	1.77	1.8	0.0
42.67	1.77	1.8	0.0	42.67	1.93	1.9	0.0	42.67	1.66	1.6	0.0	42.67	1.81	1.8	0.0
45.33	1.78	1.8	0.0	45.33	1.98	2.0	0.0	45.33	1.69	1.7	0.0	45.33	1.85	1.8	0.0
48.00	1.87	1.9	0.0	48.00	2.01	2.0	0.0	48.00	1.74	1.7	0.0	48.00	1.90	1.9	0.0
50.67	1.84	1.9	-0.1	50.67	2.03	2.0	0.0	50.67	1.76	1.8	0.0	50.67	1.93	1.9	0.0
53.33	1.88	1.9	-0.1	53.33	2.08	2.1	0.0	53.33	1.81	1.8	0.0	53.33	1.96	2.0	0.0
56.00	1.91	2.0	-0.1	56.00	2.11	2.1	0.0	56.00	1.85	1.8	0.0	56.00	2.01	2.0	0.0
58.67	2.00	2.0	0.0	58.67	2.14	2.2	0.0	58.67	1.88	1.9	0.0	58.67	2.02	2.0	0.0
61.33	2.00	2.0	-0.1	61.33	2.17	2.2	0.0	61.33	1.92	1.9	0.0	61.33	2.08	2.1	0.0
64.00	2.09	2.1	0.0	64.00	2.23	2.2	0.0	64.00	1.96	2.0	0.0	64.00	2.10	2.1	0.0
66.67	2.10	2.1	0.0	66.67	2.28	2.3	0.0	66.67	2.01	2.0	0.0	66.67	2.13	2.1	0.0
69.33	2.19	2.2	0.0	69.33	2.33	2.3	0.0	69.33	2.05	2.0	0.0	69.33	2.20	2.2	0.0
72.00	2.23	2.2	0.0	72.00	2.38	2.3	0.0	72.00	2.09	2.1	0.0	72.00	2.25	2.2	0.0
74.67	2.26	2.2	0.0	74.67	2.39	2.4	0.0	74.67	2.13	2.1	0.0	74.67	2.26	2.3	0.0
77.33	2.32	2.3	0.0	77.33	2.42	2.4	0.0	77.33	2.17	2.2	0.0	77.33	2.29	2.3	0.0
80.00	2.30	2.3	0.0	80.00	2.43	2.4	0.0	80.00	2.21	2.2	0.0	80.00	2.33	2.3	0.0
82.67	2.39	2.3	0.0	82.67	2.50	2.5	0.0	82.67	2.25	2.2	0.0	82.67	2.35	2.4	0.0
85.33	2.36	2.4	0.0	85.33	2.52	2.5	0.0	85.33	2.28	2.3	0.0	85.33	2.40	2.4	0.0
88.00	2.37	2.4	0.0	88.00	2.55	2.6	0.0	88.00	2.32	2.3	0.0	88.00	2.43	2.4	0.0
90.67	2.41	2.5	0.0	90.67	2.57	2.6	0.0	90.67	2.36	2.4	0.0	90.67	2.46	2.5	0.0
93.33	2.47	2.5	0.0	93.33	2.62	2.6	0.0	93.33	2.39	2.4	0.0	93.33	2.50	2.5	0.0
96.00	2.50	2.5	0.0	96.00	2.65	2.7	0.0	96.00	2.44	2.4	0.0	96.00	2.56	2.5	0.0
98.67	2.54	2.6	0.0	98.67	2.67	2.7	0.0	98.67	2.48	2.5	0.0	98.67	2.57	2.6	0.0
101.33	2.58	2.6	0.0	101.33	2.72	2.7	0.0	101.33	2.52	2.5	0.0	101.33	2.61	2.6	0.0
104.00	2.63	2.6	0.0	104.00	2.77	2.8	0.0	104.00	2.55	2.5	0.0	104.00	2.63	2.7	0.0
106.67	2.68	2.7	0.0	106.67	2.80	2.8	0.0	106.67	2.58	2.6	0.0	106.67	2.67	2.7	0.0
109.33	2.67	2.7	0.0	109.33	2.83	2.8	0.0	109.33	2.63	2.6	0.0	109.33	2.71	2.7	0.0
112.00	2.73	2.7	0.0	112.00	2.86	2.9	0.0	112.00	2.64	2.7	0.0	112.00	2.75	2.8	0.0
114.67	2.73	2.8	0.0	114.67	2.91	2.9	0.0	114.67	2.70	2.7	0.0	114.67	2.78	2.8	0.0
117.33	2.79	2.8	0.0	117.33	2.93	2.9	0.0	117.33	2.73	2.7	0.0	117.33	2.82	2.8	0.0
120.00	2.85	2.8	0.0	120.00	2.97	3.0	0.0	120.00	2.75	2.8	0.0	120.00	2.86	2.9	0.0
122.67	2.89	2.9	0.0	122.67	3.03	3.0	0.0	122.67	2.79	2.8	0.0	122.67	2.87	2.9	0.0
125.33	2.89	2.9	0.0	125.33	3.05	3.0	0.0	125.33	2.83	2.8	0.0	125.33	2.91	2.9	0.0
128.00	2.91	2.9	0.0	128.00	3.06	3.1	0.0	128.00	2.86	2.9	0.0	128.00	2.99	3.0	0.0
130.67	2.95	3.0	0.0	130.67	3.10	3.1	0.0	130.67	2.88	2.9	0.0	130.67	3.01	3.0	0.0
133.33	3.01	3.0	0.0	133.33	3.13	3.1	0.0	133.33	2.95	2.9	0.0	133.33	3.03	3.0	0.0
136.00	3.08	3.0	0.0	136.00	3.17	3.2	0.0	136.00	2.99	3.0	0.0	136.00	3.06	3.1	0.0
138.67	3.04	3.1	0.0	138.67	3.19	3.2	0.0	138.67	3.01	3.0	0.0	138.67	3.08	3.1	0.0
141.33	3.05	3.1	-0.1	141.33	3.22	3.2	0.0	141.33	3.05	3.0	0.0	141.33	3.12	3.1	0.0
144.00	3.03	3.1	-0.1	144.00	3.25	3.3	0.0	144.00	3.08	3.1	0.0	144.00	3.14	3.2	0.0
146.67	3.12	3.2	0.0	146.67	3.29	3.3	0.0	146.67	3.11	3.1	0.0	146.67	3.18	3.2	0.0
149.33	3.27	3.2	0.1	149.33	3.32	3.3	0.0	149.33	3.15	3.1	0.0	149.33	3.24	3.2	0.0
152.00	3.24	3.2	0.0	152.00	3.35	3.4	0.0	152.00	3.18	3.2	0.0	152.00	3.26	3.3	0.0
154.67	3.34	3.3	0.1	154.67	3.40	3.4	0.0	154.67	3.22	3.2	0.0	154.67	3.28	3.3	0.0
157.33	3.25	3.3	0.0	157.33	3.42	3.4	0.0	157.33	3.27	3.2	0.0	157.33	3.33	3.3	0.0
160.00	3.34	3.3	0.0	160.00	3.44	3.4	0.0	160.00	3.28	3.3	0.0	160.00	3.35	3.4	0.0
162.67	3.29	3.4	-0.1	162.67	3.50	3.5	0.0	162.67	3.32	3.3	0.0	162.67	3.38	3.4	0.0
165.33	3.47	3.4	0.1	165.33	3.50	3.5	0.0	165.33	3.35	3.3	0.0	165.33	3.43	3.4	0.0
168.00	3.29	3.4	-0.1	168.00	3.53	3.5	0.0	168.00	3.40	3.4	0.0	168.00	3.46	3.4	0.0
170.67	3.46	3.5	0.0	170.67	3.55	3.6	0.0	170.67	3.41	3.4	0.0	170.67	3.46	3.5	0.0
173.33	3.45	3.5	0.0	173.33	3.63	3.6	0.0	173.33	3.44	3.4	0.0	173.33	3.49	3.5	0.0
176.00	3.57	3.5	0.1	176.00	3.63	3.6	0.0	176.00	3.48	3.5	0.0	176.00	3.56	3.5	0.0
178.67	3.50	3.5	0.0	178.67	3.68	3.7	0.0	178.67	3.50	3.5	0.0	178.67	3.57	3.6	0.0
181.33	3.50	3.6	-0.1	181.33	3.69	3.7	0.0	181.33	3.55	3.5	0.0	181.33	3.60	3.6	0.0
184.00	3.63	3.6	0.0	184.00	3.72	3.7	0.0	184.00	3.58	3.6	0.0	184.00	3.65	3.6	0.0
186.67	3.60	3.6	0.0	186.67	3.73	3.7	0.0	186.67	3.60	3.6	0.0	186.67	3.67	3.7	0.0
189.33	3.69	3.7	0.0	189.33	3.77	3.8	0.0	189.33	3.64	3.6	0.0	189.33	3.67	3.7	0.0
192.00	3.67	3.7	0.0	192.00	3.79	3.8	0.0	192.00	3.67	3.7	0.0	192.00	3.71	3.7	0.0
194.67	3.80	3.7	0.1	194.67	3.83	3.8	0.0	194.67	3.69	3.7	0.0	194.67	3.74	3.8	0.0

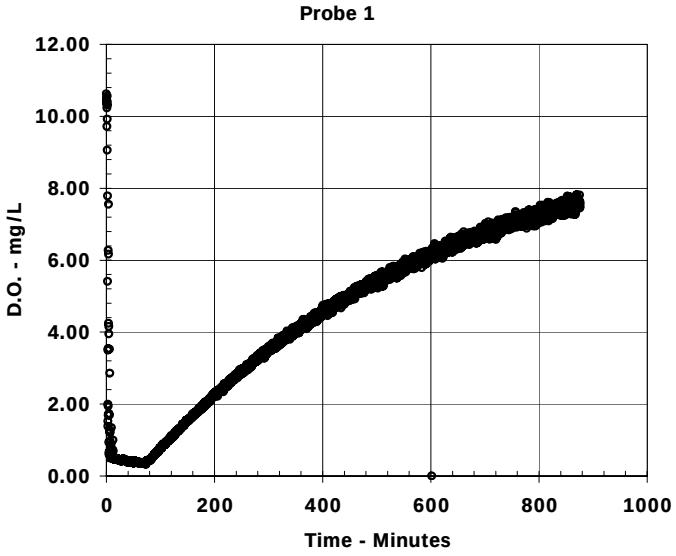
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.12	1.12		C0	1.29	1.29		C0	0.96	0.96		C0	1.15	1.15	
Kla-in	0.11	0.11		Kla-in	0.11	0.11		Kla-in	0.11	0.11		Kla-in	0.11	0.11	
C*	9.76	9.76		C*	9.71	9.71		C*	10.07	10.07		C*	9.86	9.86	
Sq.Diff.	2.1547			Sq.Diff.	0.0812			Sq.Diff.	0.0233			Sq.Diff.	0.0694		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
197.33	3.68	3.8	-0.1	197.33	3.87	3.9	0.0	197.33	3.72	3.7	0.0	197.33	3.77	3.8	0.0
200.00	3.71	3.8	-0.1	200.00	3.90	3.9	0.0	200.00	3.76	3.8	0.0	200.00	3.83	3.8	0.0
202.67	3.88	3.8	0.1	202.67	3.92	3.9	0.0	202.67	3.79	3.8	0.0	202.67	3.82	3.8	0.0
205.33	3.91	3.8	0.1	205.33	3.95	4.0	0.0	205.33	3.83	3.8	0.0	205.33	3.88	3.9	0.0
208.00	3.78	3.9	-0.1	208.00	3.96	4.0	0.0	208.00	3.85	3.9	0.0	208.00	3.88	3.9	0.0
210.67	3.92	3.9	0.0	210.67	4.01	4.0	0.0	210.67	3.88	3.9	0.0	210.67	3.92	3.9	0.0
213.33	3.87	3.9	-0.1	213.33	4.02	4.0	0.0	213.33	3.92	3.9	0.0	213.33	3.98	4.0	0.0
216.00	3.96	4.0	0.0	216.00	4.05	4.1	0.0	216.00	3.95	3.9	0.0	216.00	3.97	4.0	0.0
218.67	3.97	4.0	0.0	218.67	4.08	4.1	0.0	218.67	3.99	4.0	0.0	218.67	4.03	4.0	0.0
221.33	4.04	4.0	0.0	221.33	4.14	4.1	0.0	221.33	4.01	4.0	0.0	221.33	4.06	4.0	0.0
224.00	4.08	4.0	0.0	224.00	4.15	4.1	0.0	224.00	4.04	4.0	0.0	224.00	4.08	4.1	0.0
226.67	4.14	4.1	0.1	226.67	4.16	4.2	0.0	226.67	4.06	4.1	0.0	226.67	4.08	4.1	0.0
229.33	4.12	4.1	0.0	229.33	4.20	4.2	0.0	229.33	4.10	4.1	0.0	229.33	4.14	4.1	0.0
232.00	4.07	4.1	-0.1	232.00	4.23	4.2	0.0	232.00	4.13	4.1	0.0	232.00	4.14	4.2	0.0
234.67	4.19	4.2	0.0	234.67	4.26	4.3	0.0	234.67	4.16	4.2	0.0	234.67	4.18	4.2	0.0
237.33	4.25	4.2	0.1	237.33	4.30	4.3	0.0	237.33	4.19	4.2	0.0	237.33	4.22	4.2	0.0
240.00	4.29	4.2	0.1	240.00	4.31	4.3	0.0	240.00	4.21	4.2	0.0	240.00	4.24	4.2	0.0
242.67	4.16	4.2	-0.1	242.67	4.35	4.3	0.0	242.67	4.23	4.2	0.0	242.67	4.25	4.3	0.0
245.33	4.27	4.3	0.0	245.33	4.36	4.4	0.0	245.33	4.26	4.3	0.0	245.33	4.33	4.3	0.0
248.00	4.26	4.3	0.0	248.00	4.40	4.4	0.0	248.00	4.29	4.3	0.0	248.00	4.33	4.3	0.0
250.67	4.35	4.3	0.0	250.67	4.40	4.4	0.0	250.67	4.35	4.3	0.0	250.67	4.36	4.3	0.0
253.33	4.34	4.3	0.0	253.33	4.43	4.4	0.0	253.33	4.36	4.4	0.0	253.33	4.36	4.4	0.0
256.00	4.38	4.4	0.0	256.00	4.45	4.5	0.0	256.00	4.38	4.4	0.0	256.00	4.41	4.4	0.0
258.67	4.37	4.4	0.0	258.67	4.50	4.5	0.0	258.67	4.41	4.4	0.0	258.67	4.41	4.4	0.0
261.33	4.36	4.4	-0.1	261.33	4.57	4.5	0.0	261.33	4.45	4.4	0.0	261.33	4.45	4.5	0.0
264.00	4.40	4.4	0.0	264.00	4.54	4.5	0.0	264.00	4.47	4.5	0.0	264.00	4.46	4.5	0.0
266.67	4.54	4.5	0.1	266.67	4.58	4.6	0.0	266.67	4.49	4.5	0.0	266.67	4.49	4.5	0.0
269.33	4.49	4.5	0.0	269.33	4.60	4.6	0.0	269.33	4.50	4.5	0.0	269.33	4.51	4.5	0.0
272.00	4.46	4.5	-0.1	272.00	4.63	4.6	0.0	272.00	4.54	4.5	0.0	272.00	4.58	4.6	0.0
274.67	4.62	4.6	0.1	274.67	4.63	4.6	0.0	274.67	4.57	4.6	0.0	274.67	4.58	4.6	0.0
277.33	4.62	4.6	0.0	277.33	4.67	4.7	0.0	277.33	4.61	4.6	0.0	277.33	4.61	4.6	0.0
280.00	4.71	4.6	0.1	280.00	4.71	4.7	0.0	280.00	4.63	4.6	0.0	280.00	4.63	4.6	0.0
282.67	4.59	4.6	0.0	282.67	4.71	4.7	0.0	282.67	4.66	4.7	0.0	282.67	4.66	4.7	0.0
285.33	4.63	4.7	0.0	285.33	4.72	4.7	0.0	285.33	4.67	4.7	0.0	285.33	4.66	4.7	0.0
288.00	4.73	4.7	0.1	288.00	4.76	4.8	0.0	288.00	4.70	4.7	0.0	288.00	4.70	4.7	0.0
290.67	4.76	4.7	0.1	290.67	4.78	4.8	0.0	290.67	4.72	4.7	0.0	290.67	4.72	4.7	0.0
293.33	4.67	4.7	-0.1	293.33	4.81	4.8	0.0	293.33	4.75	4.8	0.0	293.33	4.75	4.8	0.0
296.00	4.78	4.8	0.0	296.00	4.84	4.8	0.0	296.00	4.78	4.8	0.0	296.00	4.77	4.8	0.0
298.67	4.72	4.8	-0.1	298.67	4.89	4.9	0.0	298.67	4.81	4.8	0.0	298.67	4.80	4.8	0.0
301.33	4.86	4.8	0.1	301.33	4.89	4.9	0.0	301.33	4.83	4.8	0.0	301.33	4.84	4.8	0.0
304.00	4.87	4.8	0.0	304.00	4.90	4.9	0.0	304.00	4.87	4.9	0.0	304.00	4.88	4.9	0.0
306.67	4.81	4.8	0.0	306.67	4.93	4.9	0.0	306.67	4.89	4.9	0.0	306.67	4.86	4.9	0.0
309.33	4.78	4.9	-0.1	309.33	4.95	5.0	0.0	309.33	4.92	4.9	0.0	309.33	4.92	4.9	0.0
312.00	4.86	4.9	0.0	312.00	4.98	5.0	0.0	312.00	4.93	4.9	0.0	312.00	4.92	4.9	0.0
314.67	4.97	4.9	0.1	314.67	5.00	5.0	0.0	314.67	4.97	5.0	0.0	314.67	4.96	5.0	0.0
317.33	4.93	4.9	0.0	317.33	5.05	5.0	0.0	317.33	4.99	5.0	0.0	317.33	4.98	5.0	0.0
320.00	4.99	5.0	0.0	320.00	5.07	5.1	0.0	320.00	5.01	5.0	0.0	320.00	5.00	5.0	0.0
322.67	4.92	5.0	-0.1	322.67	5.07	5.1	0.0	322.67	5.05	5.0	0.0	322.67	5.05	5.0	0.0
325.33	4.93	5.0	-0.1	325.33	5.09	5.1	0.0	325.33	5.08	5.1	0.0	325.33	5.07	5.0	0.0
328.00	5.13	5.0	0.1	328.00	5.12	5.1	0.0	328.00	5.08	5.1	0.0	328.00	5.08	5.1	0.0
330.67	4.99	5.1	-0.1	330.67	5.15	5.1	0.0	330.67	5.11	5.1	0.0	330.67	5.09	5.1	0.0
333.33	5.17	5.1	0.1	333.33	5.16	5.2	0.0	333.33	5.14	5.1	0.0	333.33	5.11	5.1	0.0
336.00	5.08	5.1	0.0	336.00	5.22	5.2	0.0	336.00	5.16	5.2	0.0	336.00	5.13	5.1	0.0
338.67	5.24	5.1	0.1	338.67	5.22	5.2	0.0	338.67	5.19	5.2	0.0	338.67	5.18	5.2	0.0
341.33	5.21	5.2	0.1	341.33	5.24	5.2	0.0	341.33	5.20	5.2	0.0	341.33	5.19	5.2	0.0
344.00	5.12	5.2	-0.1	344.00	5.25	5.3	0.0	344.00	5.23	5.2	0.0	344.00	5.23	5.2	0.0
346.67	5.31	5.2	0.1	346.67	5.29	5.3	0.0	346.67	5.25	5.3	0.0	346.67	5.25	5.2	0.0
349.33	5.31	5.2	0.1	349.33	5.31	5.3	0.0	349.33	5.29	5.3	0.0	349.33	5.24	5.3	0.0
352.00	5.12	5.2	-0.1	352.00	5.31	5.3	0.0	352.00	5.32	5.3	0.0	352.00	5.30	5.3	0.0
354.67	5.28	5.3	0.0	354.67	5.35	5.3	0.0	354.67	5.33	5.3	0.0	354.67	5.31	5.3	0.0
357.33	5.37	5.3	0.1	357.33	5.39	5.4	0.0	357.33	5.35	5.4	0.0	357.33	5.32	5.3	0.0
360.00	5.40	5.3	0.1	360.00	5.38	5.4	0.0	360.00	5.38	5.4	0.0	360.00	5.36	5.3	0.0
362.67	5.43	5.3	0.1	362.67	5.40	5.4	0.0	362.67	5.40	5.4	0.0	362.67	5.39	5.4	0.0
365.33	5.29	5.4	-0.1	365.33	5.42	5.4	0.0	365.33	5.42	5.4	0.0	365.33	5.40	5.4	0.0
368.00	5.50	5.4	0.1	368.00	5.47	5.5	0.0	368.00	5.44	5.4	0.0	368.00	5.39	5.4	0.0
370.67	5.36	5.4	0.0	370.67	5.45	5.5	0.0	370.67	5.45	5.5	0.0	370.67	5.42	5.4	0.0
373.33	5.38	5.4	0.0	373.33	5.46	5.5	0.0	373.33	5.51	5.5	0.0	373.33	5.45	5.5	0.0
376.00	5.50	5.4	0.1	376.00	5.58	5.5	0.1	376.00	5.51	5.5	0.0	376.00	5.50	5.5	0.0
378.67	5.46	5.5	0.0	378.67	5.55	5.5	0.0	378.67	5.53	5.5	0.0	378.67	5.46	5.5	0.0
381.33	5.43	5.5	0.0	381.33	5.56	5.6	0.0	381.33	5.56	5.6	0.0	381.33	5.51	5.5	0.0
384.00	5.62	5.5	0.1	384.00	5.56	5.6	0.0	384.00	5.58	5.6	0.0	384.00	5.55	5.5	0.0
386.67	5.56	5.5	0.0	386.67	5.59	5.6	0.0	386.67	5.59	5.6	0.0	386.67	5.57	5.6	0.0
389.33	5.53	5.5	0.0	389.33	5.60	5.6	0.0	389.33	5.61	5.6	0.0	389.33	5.57	5.6	0.0
392.00	5.54	5.6	0.0	392.00	5.64	5.6	0.0	392.00	5.64	5.6	0.0	392.00	5.61	5.6	0.0
394.67	5.48	5.6	-0.1	394.67	5.66	5.7	0.0	394.67	5.67	5.7	0.0	394.67	5.64	5.6	0.0
397.33	5.61	5.6	0.0	397.33	5.71	5.7	0.0	397.33	5.70	5.7	0.0	397.33	5.66	5.6	0.0
400.00	5.72	5.6	0.1	400.00	5.70	5.7	0.0	400.00	5.70	5.7	0.0	400.00	5.65	5.7	0.0
402.67	5.61	5.6	0.0	402.67	5.72	5.7	0.0	402.67	5.71	5.7	0.0	402.67	5.68	5.7	0.0

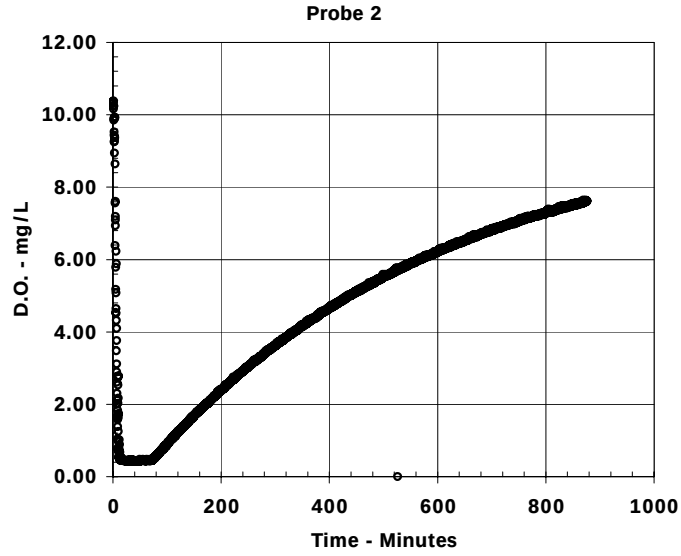
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.12	1.12		C0	1.29	1.29		C0	0.96	0.96		C0	1.15	1.15	
Kla-in	0.11	0.11		Kla-in	0.11	0.11		Kla-in	0.11	0.11		Kla-in	0.11	0.11	
C*	9.76	9.76		C*	9.71	9.71		C*	10.07	10.07		C*	9.86	9.86	
Sq.Diff.	2.1547			Sq.Diff.	0.0812			Sq.Diff.	0.0233			Sq.Diff.	0.0694		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
405.33	5.79	5.7	0.1	405.33	5.72	5.7	0.0	405.33	5.76	5.8	0.0	405.33	5.72	5.7	0.0
408.00	5.83	5.7	0.1	408.00	5.78	5.8	0.0	408.00	5.79	5.8	0.0	408.00	5.74	5.7	0.0
410.67	5.64	5.7	-0.1	410.67	5.79	5.8	0.0	410.67	5.77	5.8	0.0	410.67	5.76	5.7	0.0
413.33	5.61	5.7	-0.1	413.33	5.78	5.8	0.0	413.33	5.81	5.8	0.0	413.33	5.76	5.8	0.0
416.00	5.66	5.7	-0.1	416.00	5.83	5.8	0.0	416.00	5.84	5.8	0.0	416.00	5.80	5.8	0.0
418.67	5.69	5.8	-0.1	418.67	5.83	5.8	0.0	418.67	5.87	5.9	0.0	418.67	5.82	5.8	0.0
421.33	5.86	5.8	0.1	421.33	5.83	5.9	0.0	421.33	5.87	5.9	0.0	421.33	5.82	5.8	0.0
424.00	5.88	5.8	0.1	424.00	5.88	5.9	0.0	424.00	5.88	5.9	0.0	424.00	5.88	5.8	0.0
426.67	5.66	5.8	-0.2	426.67	5.88	5.9	0.0	426.67	5.92	5.9	0.0	426.67	5.86	5.9	0.0
429.33	5.82	5.8	0.0	429.33	5.91	5.9	0.0	429.33	5.93	5.9	0.0	429.33	5.88	5.9	0.0
432.00	5.92	5.9	0.1	432.00	5.92	5.9	0.0	432.00	5.95	6.0	0.0	432.00	5.91	5.9	0.0
434.67	5.86	5.9	0.0	434.67	5.91	5.9	0.0	434.67	5.99	6.0	0.0	434.67	5.91	5.9	0.0
437.33	5.92	5.9	0.0	437.33	5.98	6.0	0.0	437.33	6.00	6.0	0.0	437.33	5.97	5.9	0.0
440.00	5.81	5.9	-0.1	440.00	5.97	6.0	0.0	440.00	6.02	6.0	0.0	440.00	5.94	6.0	0.0
442.67	6.03	5.9	0.1	442.67	5.99	6.0	0.0	442.67	6.03	6.0	0.0	442.67	5.98	6.0	0.0
445.33	5.90	6.0	-0.1	445.33	6.02	6.0	0.0	445.33	6.05	6.1	0.0	445.33	6.02	6.0	0.0
448.00	5.90	6.0	-0.1	448.00	6.06	6.0	0.0	448.00	6.09	6.1	0.0	448.00	6.02	6.0	0.0
450.67	5.92	6.0	-0.1	450.67	6.05	6.1	0.0	450.67	6.10	6.1	0.0	450.67	6.06	6.0	0.0
453.33	6.12	6.0	0.1	453.33	6.08	6.1	0.0	453.33	6.10	6.1	0.0	453.33	6.06	6.1	0.0
456.00	5.97	6.0	-0.1	456.00	6.11	6.1	0.0	456.00	6.14	6.1	0.0	456.00	6.05	6.1	0.0
458.67	5.91	6.0	-0.1	458.67	6.12	6.1	0.0	458.67	6.16	6.2	0.0	458.67	6.09	6.1	0.0
461.33	6.17	6.1	0.1	461.33	6.12	6.1	0.0	461.33	6.16	6.2	0.0	461.33	6.09	6.1	0.0
464.00	6.03	6.1	-0.1	464.00	6.13	6.1	0.0	464.00	6.21	6.2	0.0	464.00	6.15	6.1	0.0
466.67	6.15	6.1	0.1	466.67	6.16	6.2	0.0	466.67	6.21	6.2	0.0	466.67	6.14	6.1	0.0
469.33	6.01	6.1	-0.1	469.33	6.17	6.2	0.0	469.33	6.24	6.2	0.0	469.33	6.18	6.2	0.0
472.00	6.09	6.1	0.0	472.00	6.21	6.2	0.0	472.00	6.25	6.2	0.0	472.00	6.18	6.2	0.0
474.67	6.15	6.2	0.0	474.67	6.22	6.2	0.0	474.67	6.27	6.3	0.0	474.67	6.22	6.2	0.0
477.33	6.29	6.2	0.1	477.33	6.25	6.2	0.0	477.33	6.29	6.3	0.0	477.33	6.20	6.2	0.0
480.00	6.22	6.2	0.0	480.00	6.25	6.2	0.0	480.00	6.30	6.3	0.0	480.00	6.25	6.2	0.0
482.67	6.33	6.2	0.1	482.67	6.27	6.3	0.0	482.67	6.33	6.3	0.0	482.67	6.27	6.3	0.0
485.33	6.32	6.2	0.1	485.33	6.28	6.3	0.0	485.33	6.35	6.3	0.0	485.33	6.30	6.3	0.0
488.00	6.32	6.2	0.1	488.00	6.29	6.3	0.0	488.00	6.35	6.4	0.0	488.00	6.30	6.3	0.0
490.67	6.27	6.3	0.0	490.67	6.31	6.3	0.0	490.67	6.36	6.4	0.0	490.67	6.30	6.3	0.0
493.33	6.32	6.3	0.0	493.33	6.35	6.3	0.0	493.33	6.37	6.4	0.0	493.33	6.31	6.3	0.0
496.00	6.37	6.3	0.1	496.00	6.36	6.3	0.0	496.00	6.40	6.4	0.0	496.00	6.32	6.3	0.0
498.67	6.21	6.3	-0.1	498.67	6.36	6.4	0.0	498.67	6.42	6.4	0.0	498.67	6.36	6.4	0.0
501.33	6.40	6.3	0.1	501.33	6.38	6.4	0.0	501.33	6.45	6.5	0.0	501.33	6.37	6.4	0.0
504.00	6.38	6.3	0.0	504.00	6.40	6.4	0.0	504.00	6.48	6.5	0.0	504.00	6.38	6.4	0.0
506.67	6.36	6.4	0.0	506.67	6.42	6.4	0.0	506.67	6.49	6.5	0.0	506.67	6.41	6.4	0.0
509.33	6.31	6.4	-0.1	509.33	6.41	6.4	0.0	509.33	6.51	6.5	0.0	509.33	6.38	6.4	0.0
512.00	6.32	6.4	-0.1	512.00	6.44	6.4	0.0	512.00	6.53	6.5	0.0	512.00	6.42	6.4	0.0
514.67	6.47	6.4	0.1	514.67	6.47	6.5	0.0	514.67	6.53	6.5	0.0	514.67	6.45	6.5	0.0
517.33	6.34	6.4	-0.1	517.33	6.46	6.5	0.0	517.33	6.55	6.6	0.0	517.33	6.49	6.5	0.0
520.00	6.49	6.4	0.0	520.00	6.49	6.5	0.0	520.00	6.56	6.6	0.0	520.00	6.48	6.5	0.0
522.67	6.54	6.5	0.1	522.67	6.53	6.5	0.0	522.67	6.59	6.6	0.0	522.67	6.51	6.5	0.0
525.33	6.55	6.5	0.1	525.33	6.53	6.5	0.0	525.33	6.60	6.6	0.0	525.33	6.53	6.5	0.0
528.00	6.35	6.5	-0.1	528.00	6.54	6.5	0.0	528.00	6.61	6.6	0.0	528.00	6.54	6.5	0.0
530.67	6.32	6.5	-0.2	530.67	6.53	6.6	0.0	530.67	6.64	6.6	0.0	530.67	6.54	6.6	0.0
533.33	6.54	6.5	0.0	533.33	6.56	6.6	0.0	533.33	6.65	6.7	0.0	533.33	6.57	6.6	0.0
536.00	6.79	6.5	0.3	536.00	6.58	6.6	0.0	536.00	6.67	6.7	0.0	536.00	6.58	6.6	0.0
538.67	6.51	6.6	0.0	538.67	6.61	6.6	0.0	538.67	6.71	6.7	0.0	538.67	6.59	6.6	0.0
541.33	6.48	6.6	-0.1	541.33	6.61	6.6	0.0	541.33	6.71	6.7	0.0	541.33	6.61	6.6	0.0
544.00	6.60	6.6	0.0	544.00	6.69	6.6	0.1	544.00	6.72	6.7	0.0	544.00	6.62	6.6	0.0
546.67	6.44	6.6	-0.2	546.67	6.63	6.7	0.0	546.67	6.74	6.7	0.0	546.67	6.64	6.6	0.0
549.33	6.69	6.6	0.1	549.33	6.67	6.7	0.0	549.33	6.75	6.8	0.0	549.33	6.67	6.7	0.0
552.00	6.59	6.6	0.0	552.00	6.68	6.7	0.0	552.00	6.77	6.8	0.0	552.00	6.70	6.7	0.0
554.67	6.58	6.6	-0.1	554.67	6.69	6.7	0.0	554.67	6.79	6.8	0.0	554.67	6.68	6.7	0.0
557.33	6.70	6.7	0.0	557.33	6.73	6.7	0.0	557.33	6.81	6.8	0.0	557.33	6.72	6.7	0.0
560.00	6.58	6.7	-0.1	560.00	6.74	6.7	0.0	560.00	6.81	6.8	0.0	560.00	6.75	6.7	0.0
562.67	6.50	6.7	-0.2	562.67	6.76	6.7	0.0	562.67	6.84	6.8	0.0	562.67	6.73	6.7	0.0
565.33	6.62	6.7	-0.1	565.33	6.75	6.8	0.0	565.33	6.86	6.9	0.0	565.33	6.78	6.8	0.0
568.00	6.78	6.7	0.1	568.00	6.75	6.8	0.0	568.00	6.87	6.9	0.0	568.00	6.77	6.8	0.0
570.67	6.74	6.7	0.0	570.67	6.77	6.8	0.0	570.67	6.89	6.9	0.0	570.67	6.77	6.8	0.0
573.33	6.68	6.8	-0.1	573.33	6.79	6.8	0.0	573.33	6.91	6.9	0.0	573.33	6.80	6.8	0.0
576.00	6.93	6.8	0.2	576.00	6.83	6.8	0.0	576.00	6.92	6.9	0.0	576.00	6.81	6.8	0.0
578.67	6.78	6.8	0.0	578.67	6.83	6.8	0.0	578.67	6.94	6.9	0.0	578.67	6.82	6.8	0.0
581.33	6.92	6.8	0.1	581.33	6.82	6.8	0.0	581.33	6.96	6.9	0.0	581.33	6.85	6.8	0.0
584.00	6.79	6.8	0.0	584.00	6.85	6.9	0.0	584.00	6.96	7.0	0.0	584.00	6.86	6.9	0.0
586.67	6.86	6.8	0.0	586.67	6.86	6.9	0.0	586.67	6.98	7.0	0.0	586.67	6.86	6.9	0.0
589.33	6.93	6.8	0.1	589.33	6.88	6.9	0.0	589.33	7.00	7.0	0.0	589.33	6.91	6.9	0.0
592.00	6.94	6.9	0.1	592.00	6.92	6.9	0.0	592.00	7.01	7.0	0.0	592.00	6.92	6.9	0.0
594.67	6.75	6.9	-0.1	594.67	6.93	6.9	0.0	594.67	7.03	7.0	0.0	594.67	6.95	6.9	0.0
597.33	6.83	6.9	-0.1	597.33	6.89	6.9	0.0	597.33	7.02	7.0	0.0	597.33	6.91	6.9	0.0
600.00	6.80	6.9	-0.1	600.00	6.94	6.9	0.0	600.00	7.05	7.1	0.0	600.00	6.97	6.9	0.0
602.67	6.91	6.9	0.0	602.67	6.97	7.0	0.0	602.67	7.07	7.1	0.0	602.67	6.97	7.0	0.0
605.33	6.83	6.9	-0.1	605.33	6.99	7.0	0.0	605.33	7.09	7.1	0.0	605.33	6.97	7.0	0.0
608.00	6.96	6.9	0.0	608.00	6.97	7.0	0.0	608.00	7.11	7.1	0.0	608.00	7.01	7.0	0.0
610.67	6.87	7.0	-0.1	610.67	7.00	7.0	0.0	610.67	7.12	7.1	0.0	610.67	6.97	7.0	0.0

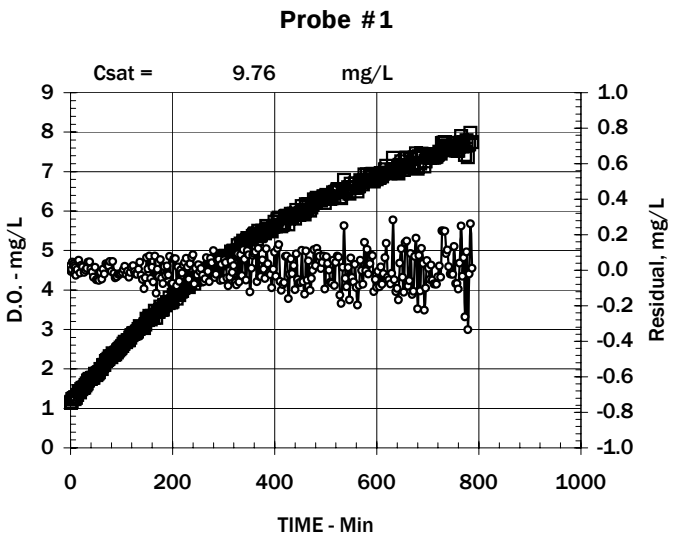
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	est.	calc.		Pt. 4	est.	calc.	
C0	1.12	1.12		C0	1.29	1.29		C0	0.96	0.96		C0	1.15	1.15	
Kla-in	0.11	0.11		Kla-in	0.11	0.11		Kla-in	0.11	0.11		Kla-in	0.11	0.11	
C*	9.76	9.76		C*	9.71	9.71		C*	10.07	10.07		C*	9.86	9.86	
Sq.Diff.	2.1547			Sq.Diff.	0.0812			Sq.Diff.	0.0233			Sq.Diff.	0.0694		
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
613.33	6.95	7.0	0.0	613.33	7.02	7.0	0.0	613.33	7.12	7.1	0.0	613.33	7.03	7.0	0.0
616.00	7.05	7.0	0.1	616.00	7.01	7.0	0.0	616.00	7.14	7.1	0.0	616.00	7.01	7.0	0.0
618.67	7.15	7.0	0.2	618.67	7.00	7.0	0.0	618.67	7.17	7.2	0.0	618.67	7.04	7.0	0.0
621.33	6.97	7.0	0.0	621.33	7.05	7.0	0.0	621.33	7.18	7.2	0.0	621.33	7.04	7.1	0.0
624.00	6.97	7.0	-0.1	624.00	7.04	7.1	0.0	624.00	7.19	7.2	0.0	624.00	7.09	7.1	0.0
626.67	6.96	7.0	-0.1	626.67	7.07	7.1	0.0	626.67	7.19	7.2	0.0	626.67	7.06	7.1	0.0
629.33	7.03	7.0	0.0	629.33	7.09	7.1	0.0	629.33	7.21	7.2	0.0	629.33	7.09	7.1	0.0
632.00	7.34	7.1	0.3	632.00	7.09	7.1	0.0	632.00	7.22	7.2	0.0	632.00	7.10	7.1	0.0
634.67	7.02	7.1	-0.1	634.67	7.14	7.1	0.0	634.67	7.24	7.2	0.0	634.67	7.15	7.1	0.0
637.33	6.97	7.1	-0.1	637.33	7.14	7.1	0.0	637.33	7.26	7.3	0.0	637.33	7.14	7.1	0.0
640.00	7.00	7.1	-0.1	640.00	7.14	7.1	0.0	640.00	7.26	7.3	0.0	640.00	7.16	7.2	0.0
642.67	6.95	7.1	-0.2	642.67	7.15	7.1	0.0	642.67	7.28	7.3	0.0	642.67	7.15	7.2	0.0
645.33	7.17	7.1	0.0	645.33	7.18	7.2	0.0	645.33	7.28	7.3	0.0	645.33	7.20	7.2	0.0
648.00	7.26	7.1	0.1	648.00	7.17	7.2	0.0	648.00	7.30	7.3	0.0	648.00	7.19	7.2	0.0
650.67	7.11	7.2	0.0	650.67	7.18	7.2	0.0	650.67	7.32	7.3	0.0	650.67	7.20	7.2	0.0
653.33	7.04	7.2	-0.1	653.33	7.21	7.2	0.0	653.33	7.34	7.3	0.0	653.33	7.21	7.2	0.0
656.00	7.33	7.2	0.2	656.00	7.19	7.2	0.0	656.00	7.34	7.3	0.0	656.00	7.23	7.2	0.0
658.67	7.35	7.2	0.2	658.67	7.22	7.2	0.0	658.67	7.38	7.4	0.0	658.67	7.22	7.2	0.0
661.33	7.11	7.2	-0.1	661.33	7.21	7.2	0.0	661.33	7.38	7.4	0.0	661.33	7.28	7.3	0.0
664.00	7.16	7.2	-0.1	664.00	7.23	7.2	0.0	664.00	7.40	7.4	0.0	664.00	7.27	7.3	0.0
666.67	7.32	7.2	0.1	666.67	7.25	7.3	0.0	666.67	7.40	7.4	0.0	666.67	7.26	7.3	0.0
669.33	7.10	7.2	-0.1	669.33	7.28	7.3	0.0	669.33	7.41	7.4	0.0	669.33	7.29	7.3	0.0
672.00	7.14	7.3	-0.1	672.00	7.28	7.3	0.0	672.00	7.43	7.4	0.0	672.00	7.32	7.3	0.0
674.67	7.34	7.3	0.1	674.67	7.29	7.3	0.0	674.67	7.45	7.4	0.0	674.67	7.31	7.3	0.0
677.33	7.46	7.3	0.2	677.33	7.32	7.3	0.0	677.33	7.45	7.5	0.0	677.33	7.31	7.3	0.0
680.00	7.07	7.3	-0.2	680.00	7.32	7.3	0.0	680.00	7.46	7.5	0.0	680.00	7.32	7.3	0.0
682.67	7.39	7.3	0.1	682.67	7.33	7.3	0.0	682.67	7.49	7.5	0.0	682.67	7.35	7.4	0.0
685.33	7.20	7.3	-0.1	685.33	7.30	7.3	0.0	685.33	7.50	7.5	0.0	685.33	7.35	7.4	0.0
688.00	7.45	7.3	0.1	688.00	7.32	7.4	0.0	688.00	7.51	7.5	0.0	688.00	7.37	7.4	0.0
690.67	7.38	7.3	0.0	690.67	7.34	7.4	0.0	690.67	7.52	7.5	0.0	690.67	7.41	7.4	0.0
693.33	7.12	7.4	-0.2	693.33	7.35	7.4	0.0	693.33	7.51	7.5	0.0	693.33	7.40	7.4	0.0
696.00	7.26	7.4	-0.1	696.00	7.40	7.4	0.0	696.00	7.54	7.5	0.0	696.00	7.43	7.4	0.0
698.67	7.43	7.4	0.1	698.67	7.40	7.4	0.0	698.67	7.54	7.6	0.0	698.67	7.43	7.4	0.0
701.33	7.40	7.4	0.0	701.33	7.43	7.4	0.0	701.33	7.57	7.6	0.0	701.33	7.44	7.4	0.0
704.00	7.34	7.4	-0.1	704.00	7.48	7.4	0.1	704.00	7.57	7.6	0.0	704.00	7.43	7.5	0.0
706.67	7.44	7.4	0.0	706.67	7.44	7.4	0.0	706.67	7.58	7.6	0.0	706.67	7.45	7.5	0.0
709.33	7.37	7.4	-0.1	709.33	7.46	7.4	0.0	709.33	7.59	7.6	0.0	709.33	7.47	7.5	0.0
712.00	7.35	7.4	-0.1	712.00	7.44	7.5	0.0	712.00	7.61	7.6	0.0	712.00	7.46	7.5	0.0
714.67	7.37	7.4	-0.1	714.67	7.49	7.5	0.0	714.67	7.62	7.6	0.0	714.67	7.48	7.5	0.0
717.33	7.38	7.5	-0.1	717.33	7.50	7.5	0.0	717.33	7.65	7.6	0.0	717.33	7.50	7.5	0.0
720.00	7.43	7.5	0.0	720.00	7.50	7.5	0.0	720.00	7.66	7.7	0.0	720.00	7.54	7.5	0.0
722.67	7.50	7.5	0.0	722.67	7.49	7.5	0.0	722.67	7.66	7.7	0.0	722.67	7.51	7.5	0.0
725.33	7.45	7.5	0.0	725.33	7.51	7.5	0.0	725.33	7.67	7.7	0.0	725.33	7.55	7.5	0.0
728.00	7.72	7.5	0.2	728.00	7.49	7.5	0.0	728.00	7.68	7.7	0.0	728.00	7.54	7.6	0.0
730.67	7.73	7.5	0.2	730.67	7.50	7.5	0.0	730.67	7.71	7.7	0.0	730.67	7.56	7.6	0.0
733.33	7.74	7.5	0.2	733.33	7.52	7.5	0.0	733.33	7.71	7.7	0.0	733.33	7.56	7.6	0.0
736.00	7.63	7.5	0.1	736.00	7.52	7.6	0.0	736.00	7.72	7.7	0.0	736.00	7.57	7.6	0.0
738.67	7.66	7.5	0.1	738.67	7.56	7.6	0.0	738.67	7.73	7.7	0.0	738.67	7.59	7.6	0.0
741.33	7.57	7.6	0.0	741.33	7.57	7.6	0.0	741.33	7.75	7.7	0.0	741.33	7.62	7.6	0.0
744.00	7.54	7.6	0.0	744.00	7.55	7.6	0.0	744.00	7.73	7.8	0.0	744.00	7.62	7.6	0.0
746.67	7.55	7.6	0.0	746.67	7.57	7.6	0.0	746.67	7.76	7.8	0.0	746.67	7.62	7.6	0.0
749.33	7.56	7.6	0.0	749.33	7.64	7.6	0.0	749.33	7.77	7.8	0.0	749.33	7.63	7.6	0.0
752.00	7.73	7.6	0.1	752.00	7.67	7.6	0.0	752.00	7.79	7.8	0.0	752.00	7.68	7.7	0.0
754.67	7.53	7.6	-0.1	754.67	7.68	7.6	0.0	754.67	7.81	7.8	0.0	754.67	7.66	7.7	0.0
757.33	7.54	7.6	-0.1	757.33	7.65	7.6	0.0	757.33	7.80	7.8	0.0	757.33	7.66	7.7	0.0
760.00	7.52	7.6	-0.1	760.00	7.66	7.6	0.0	760.00	7.81	7.8	0.0	760.00	7.69	7.7	0.0
762.67	7.68	7.6	0.0	762.67	7.65	7.7	0.0	762.67	7.84	7.8	0.0	762.67	7.71	7.7	0.0
765.33	7.90	7.6	0.2	765.33	7.68	7.7	0.0	765.33	7.85	7.8	0.0	765.33	7.69	7.7	0.0
768.00	7.63	7.7	0.0	768.00	7.70	7.7	0.0	768.00	7.86	7.9	0.0	768.00	7.72	7.7	0.0
770.67	7.74	7.7	0.1	770.67	7.67	7.7	0.0	770.67	7.87	7.9	0.0	770.67	7.71	7.7	0.0
773.33	7.42	7.7	-0.3	773.33	7.70	7.7	0.0	773.33	7.88	7.9	0.0	773.33	7.74	7.7	0.0
776.00	7.79	7.7	0.1	776.00	7.71	7.7	0.0	776.00	7.89	7.9	0.0	776.00	7.76	7.7	0.0
778.67	7.37	7.7	-0.3	778.67	7.72	7.7	0.0	778.67	7.89	7.9	0.0	778.67	7.77	7.8	0.0
781.33	7.69	7.7	0.0	781.33	7.80	7.7	0.1	781.33	7.90	7.9	0.0	781.33	7.80	7.8	0.0
784.00	7.98	7.7	0.3	784.00	7.74	7.7	0.0	784.00	7.92	7.9	0.0	784.00	7.80	7.8	0.0
786.67	7.74	7.7	0.0	786.67	7.75	7.7	0.0	786.67	7.92	7.9	0.0	786.67	7.80	7.8	0.0

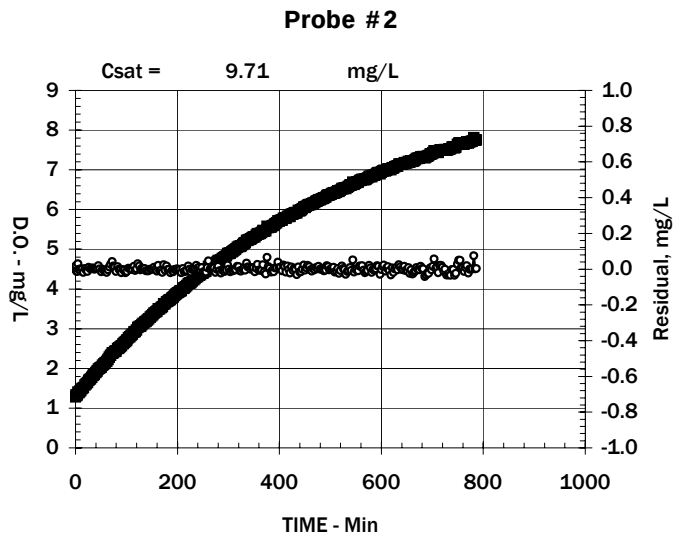
	Probe 1				Probe 2				Probe 3				Probe 4		
Lower	11.66%			Lower	13.23%			Lower	9.54%			Lower	11.76%		
Upper	81.75%			Upper	80.34%			Upper	78.64%			Upper	79.12%		
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE
C*	9.763	0.065	0.663	C*	9.713	0.012	0.128	C*	10.070	0.007	0.067	C*	9.863	0.012	0.120
C0	1.124	0.016	1.424	C0	1.288	0.003	0.241	C0	0.956	0.002	0.174	C0	1.149	0.003	0.250
KLaT	0.110	0.000	1.423	KLaT	0.111	0.000	0.281	KLaT	0.111	0.000	0.140	KLaT	0.109	0.000	0.256
Error	0.085			Error	0.017			Error	0.009			Error	0.015		

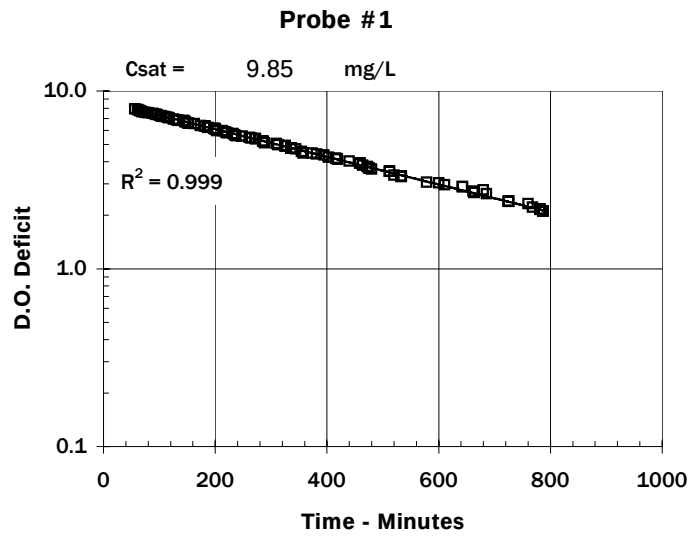
PROJECT: PHi (Faster Valve Test)
DATE: 11/9/2006
RUN: 4.00

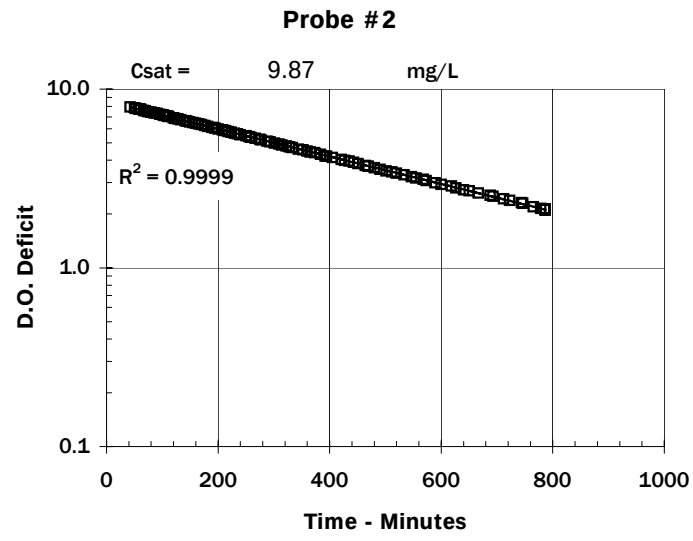




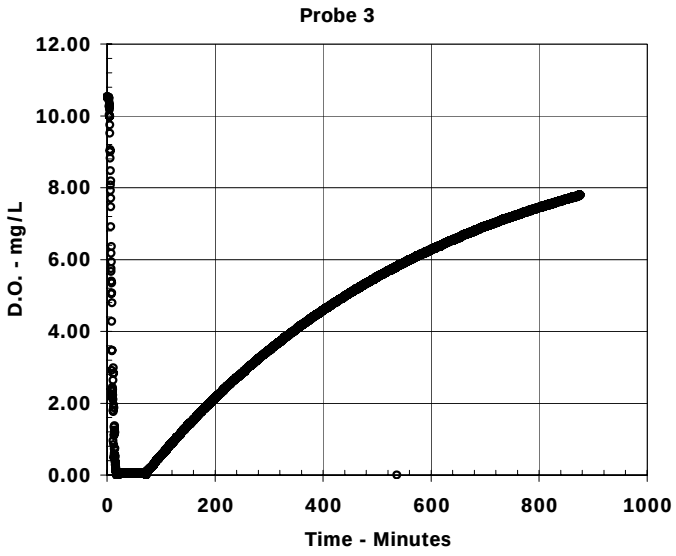


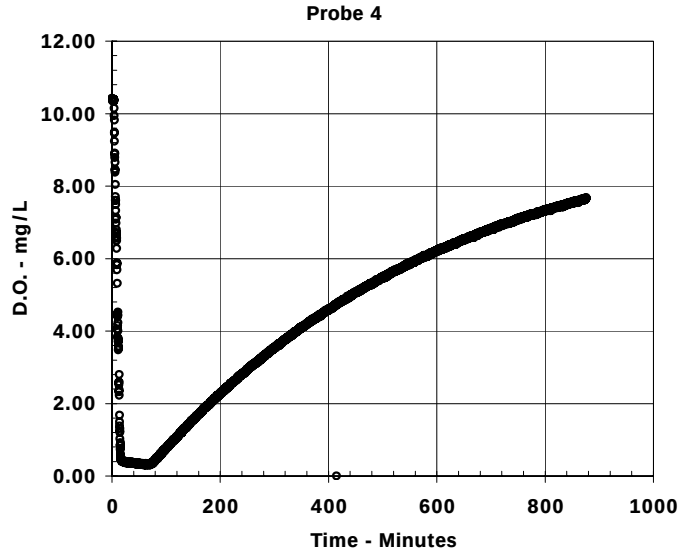


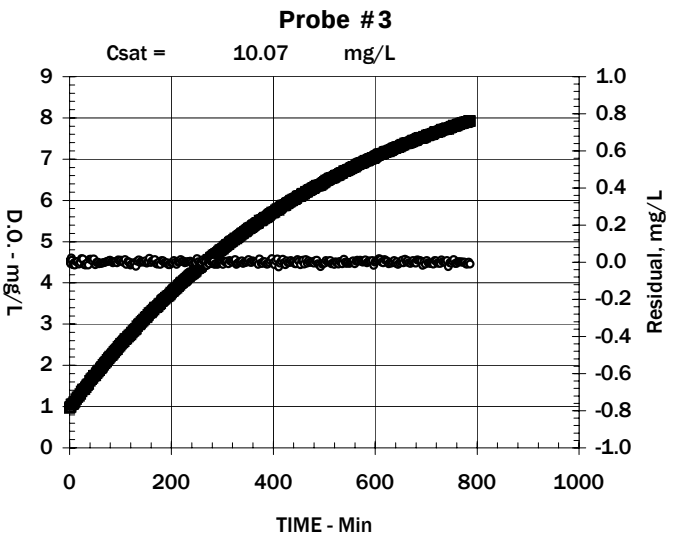


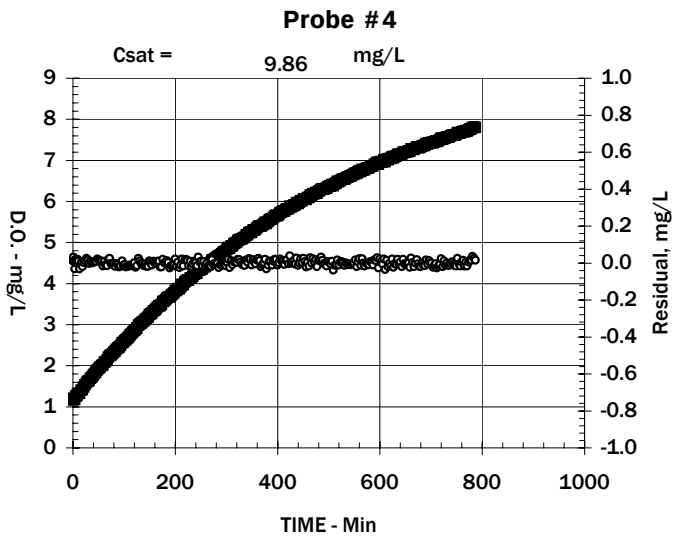


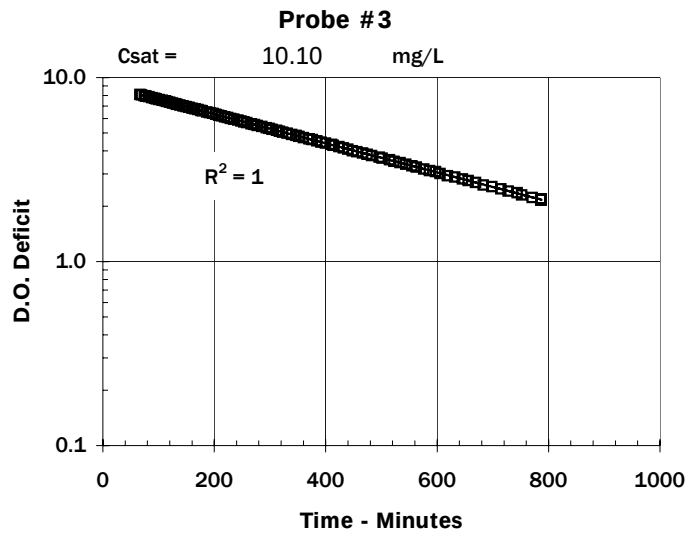
Project: PHi (Faster Valve Test)
Date: Nov 09, 2006
Run: 4

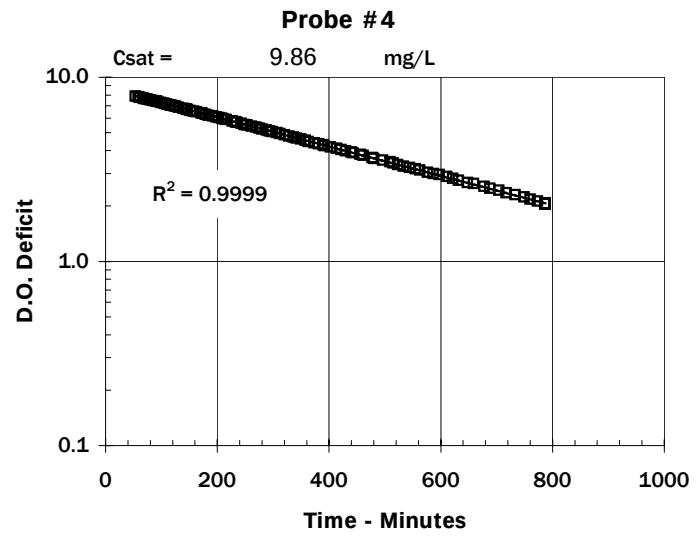












Project: PHi (Faster Valve Test)
Date: Nov 09, 2006
Run: 4

AIR FLOW RATE DETERMINATION
ANR 73 COMMERCIAL ANNUBAR

PROJECT : PHi (Faster Valve Test)

SCFM = $C'' \frac{[BP + LP]}{[LT + 460]}$

C' = Fna * k * D^2 * Fra * Fpb * Ftb * Fg * Fpv * Faa * Fl * Fm * Ya

C'' = C' VALUE CORRECTED FOR HUMIDITY

RUN	#		**4**	
DATE			Nov-06	
OPERATING CONDITIONS			AWR-73	
ANNUBAR TYPE			2	
BAROMETRIC PRESSURE	* **BP**		14.23	PSIA
LINE PRESSURE	* **LP**		45.02	PSIG
LINE TEMPERATURE	* **LT**		68	°F
DIFFERENTIAL PRESSURE	* **^H**		0.01	In. H2O
RELATIVE HUMIDITY	* **RH**		57%	%
AMBIENT TEMPERATURE	*	**15.5**	68	°F
PIPE INSIDE DIAMETER	* **D**		4.026	In.
UNITS CONVERSION FACTOR	**Fna**		128.520	
ANNUBAR FLOW COEFFICIENT	**k**		0.746	
SQUARE OF PIPE ID	**D^2**		16.209	
BASE PRESSURE			14.700	PSIA
BASE PRESSURE FACTOR	**Fpb**		1.002	
BASE TEMPERATURE			68.000	°F
BASE TEMPERATURE FACTOR	**Ftb**		1.015	
THERMAL EXPANSION FACTOR	**Faa**		1.001	
MANOMETER LOCATION FACTOR	**Fl**		1.000	
HG MANOMETER CORRECTION FACTOR	**Fm**		1.000	
REYNOLD NUMBER	**Rd**		15,244.7	
FLOWING VICOSITY	**vis**		0.018	cP
REYNOLD NUMBER FACTOR	**Fra**		0.965	
SPECIFIC GRAVITY	**g**		1.000	
SPECIFIC GRAVITY FACTOR	**Fg**		1.000	
SUPERCOMPRESSIBILTY	**Z**		0.998	
SUPERCOMPRESSIBILTY FACTOR	**Fpv**		1.001	
GAS EXPANSION FACTOR	**Ya**		1.000	
SCFM UNCORRECTED FOR HUMIDITY	**SCFM**		38.3	
C'			1,527.28	
VAPOR PRESSURE OF WATER AMB. TEMP.	**VP**		0.340	
ACTUAL CUBIC FEET PER MINUTE	**ACFM**		9.5	107.4
HUMIDITY CORRECTED STANDARD AIR FLOW	**SCFM**		**38.1**	@68°F, 36% RH, 14.7 PSIA
INLET CUBIC FEET PER MINUTE	**ICFM**		**39.5**	
C''			**1,518.30**	

FORMULAS AND FACTORS DERIVED FROM: L.K.Spink; "Principles and Practice of FLOW METER ENGINEERING"; Ninth Ed., Nov 1975; The FOXBORO CO., Foxboro, Mass.
"ORIFICE FLOW METER"; THE BRISTOL COMPANY; Waterbury, Conn.
"ANNUBAR FLOW HANDBOOK"; August 1978; DIETERICH STANDARD CORPORATION; Boulder, Co.

HUMIDITY CORRECTED AIR FLOW DETERMINED per: "ASCE STANDARD Measurement of Oxygen Transfer in Clean Water";ANNEX A; July 1984; American Society of Civil Engineers