CALIBRATION CERTIFICATE

AANDERAA DATA INSTRUMENTS

Sensing Foil Batch No:	1707	**Product:**	5013
Certificate No:	5013 19 1061	**Serial No:**	19
		Calibration Date:	December 16, 2010

This is to certify that this product has been calibrated using the following instruments:

Fluke CHUB E-4	Serial No. A7C677
Fluke 5615 PRT	Serial No. 849155
Fluke 5615 PRT	Serial No. 802054
Honeywell PPT	Serial No. 44074
Calibration Bath model FNT 321-1-40	1

Parameter: Internal Temperature:

Calibration points and readings:

Temperature (°C)	-	-	-	-
Reading (mV)	-	-	-	-

Giving these coefficients

Index	0	1	2	3
TempCoef	2.65834E+01	-3.10940E-02	2.93876E-06	-4.33055E-09

*Note: No temperature calibration was performed

Parameter: Oxygen:

	O2 Concentration	Air Saturation
Range:	0-500 µM [1)]	0 - 120%
Accuracy[1)]:	< ±8µM or ±5%(whichever is greater)	±5%
Resolution:	< 1 µM	< 0.4%
Settling Time (63%):	< 25 seconds	

Calibration points and readings[2)]:

	Air Saturated Water	Zero Solution (Na_2SO_3)
Phase reading (°)	3.32154E+01	6.50336E+01
Temperature reading (°C)	1.05313E+01	2.06360E+01
Air Pressure (hPa)	1.00726E+03	

Giving these coefficients

Index	0	1	2	3
PhaseCoef	-3.75258E+00	1.18636E+00	0.00000E+00	0.00000E+00

[1)] *Valid for 0 to 2000m (6562ft) depth, salinity 33 - 37ppt*

[2)] *The calibration is performed in fresh water and the salinity setting is set to: 0*

Date:
December 16, 2010

Sign: Shawn A. Sneddon

Service and Calibration Engineer

Aanderaa Data Instruments, Inc.
182 East Street Attleboro, MA 02703 Tel. +1 (508) 226-9300 email: infoUSA@aadi.no
an ITT Analytics Company

CALIBRATION CERTIFICATE

AANDERAA DATA INSTRUMENTS

Sensing Foil Batch No:	1707	**Product:**	5013
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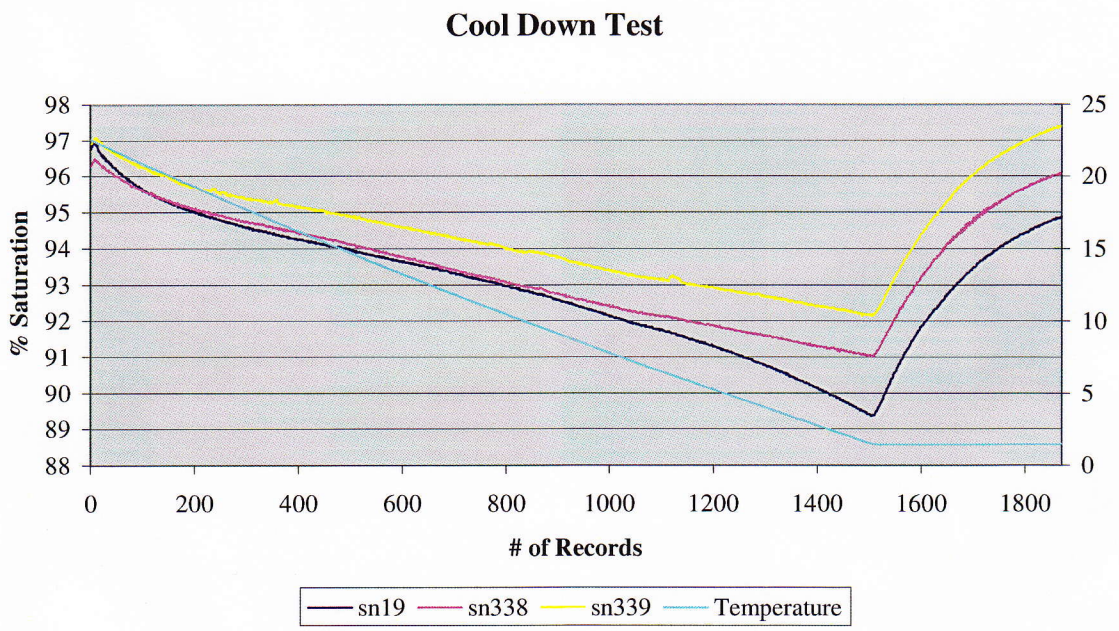
Data from Cool Down Test:



SR10 Scaling Coefficients:

At the SR10 output the Oxygen Optode 3830 can give either absolute oxygen concentration in µM or air saturation in %. The setting of the internal property "Output" [3], controls the selection of the unit. The coefficients for converting SR10 raw data to engineering units are fixed.

Output = -1	Output = -2
A = 0	A = 0
B = 4.883E-01	B = 1.465E-01
C = 0	C= 0
D = 0	D = 0
Oxygen (uM) = A + BN + CN2 + DN3	Oxygen (%) = A + BN + CN2 + DN3

[3] *The default output setting is set to -1*

Date:
December 16, 2010

Sign: Shawn A. Sneddon

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CALIBRATION CERTIFICATE

Form No. 710, Dec 2005

AANDERAA DATA INSTRUMENTS

Sensing Foil Batch No: 1707
Certificate No:

Product: O2 Sensing Foil PSt3 3853
Calibration Date: 22 June 2007

Calibration points and phase readings (degrees)

Temperature (°C)		4.54	10.98	20.44	29.92	39.26
Pressure (hPa)		968.25	968.25	968.25	968.25	968.25
O2 in % of O2+N2	0.00	74.37	73.85	73.04	72.17	70.99
	1.00	69.53	68.59	67.18	65.72	64.11
	2.00	66.04	64.85	63.10	61.34	59.52
	5.00	57.77	56.17	53.91	51.75	49.74
	10.00	48.62	46.85	44.43	42.22	40.29
	20.90	37.69	36.01	33.81	31.89	30.28
	30.00	32.57	31.02	29.05	27.36	25.96

Giving these coefficients [1)]

Index	0	1	2	3
C0 Coefficient	5.32650E+03	-1.92117E+02	4.14357E+00	-3.78695E-02
C1 Coefficient	-2.92068E+02	9.71993E+00	-2.14295E-01	2.00778E-03
C2 Coefficient	6.47595E+00	-1.98080E-01	4.49940E-03	-4.30530E-05
C3 Coefficient	-6.69288E-02	1.88066E-03	-4.42348E-05	4.28382E-07
C4 Coefficient	2.65042E-04	-6.83185E-06	1.67071E-07	-1.61989E-09

[1)] *Ask for Form No 621S when this O2 Sensing Foil is used in Oxygen Sensor 3830 with Serial Numbers lower than 184.*

Date:
December 16, 2010

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TEST & SPECIFICATIONS

AANDERAA DATA INSTRUMENTS

Layout No:		**Product:**	5013
Circuit Diagram No:		**Serial No:**	19
Program Version:			

1. Visual and Mechanical Checks:	
1.1. O-ring surface	N/A
1.2. Soldering quality	N/A
1.3. Visual surface	OK
1.4. Pressure test (60MPa)	N/A
1.5. Galvanic isolation between housing and electronics	N/A
2. Current Drain and Voltages:	
2.1. Average current drain at 0.5Hz sampling (Max: 38mA)	31.53 mA
2.2. Current drain in sleep (Max: 300uA)	195.3 uA
3. Performance Test in Air, 20°C Temperature:	
3.1. Amplitude measurement (Blue: 290 – 470mV)	380.98 mV
3.2. Phase measurement (Blue: 27 ±5°)	30.57 °
3.3 Temperature Measurement (100 ± 300mV)	120.19 mV
4. Firmware:	
4.1. Firmware upgrade	3.22

Date:
December 16, 2010

Sign: Shawn A. Sneddon

Service and Calibration Engineer

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AANDERAA DATA INSTRUMENTS

SERVICE REPORT

Service report no
254906

Customer Info

Customer no	**2120052**	*Delivery to*	
Customer	**University of Hawaii**	**University of Hawaii**	
Contact	**Jennie Mowatt**	*Date of receipt*	**13.12.2010**
Your ref	**PO# Z973162**	*Delivery date*	**17.12.2010**

Serviced Items

Type	*Serial no*		*Next service:*	**16.12.2011**
5013	**19**	**Oxygen Optode**		

Reason for service **Service and calibration**

Service comments

1) Checked visual condition: OK.
2) Checked current consumption: operating = 31.53mA, quiescent = 195.3uA.
3) Performance test in air checking BAmp, BPhase, and RawTemp: OK.
4) Checked firmware version: OLD; upgraded to version 3.22.
5) Checked temperature in 10deg.C bath versus reference: sn19 = 10.49, reference = 10.498; OK.
6) Checked in 100% saturated bath versus reference optode: sn19 = 91.21%, sn339 = 97.097%; needs saturation calibration.
7) Checked foil: OK.
8) Performed saturation calibration at 100% and 0% saturation: PASSED.
9) Checked in 100% saturated bath versus reference optode: sn19 = 98.85%, sn339 = 98.709%.
10) Checked saturation in 20 deg.C bath versus reference optode: sn19 = 95.84%, sn339 = 96.110%.
11) Performed cool down test from 20 to 1 deg.C: PASSED.
12) Restored sensor to customer settings.

Test comments **PASSED**

Summary

Serviced	*Repaired*	*Total*
0	**0**	**0**

Bergen, 16.12.2010

Service engineer

All prices are in **NOK**

Shawn Sneddon

AANDERAA DATA INSTRUMENTS AS

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