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CALIBRATION CERTIFICATE

Form No 830, March 2021

Certificate no: 4831_954_00181582
Foil batch no: 1824M

Product: 4831
Calibration date: 14.02.2021

Serial no: 954

Index	Temperature reference(°C)	[O2] Reference(µM)	Temperature raw data(mV)	Phase reading(°)
0	30.229	1.60	-191.553	59.74
1	20.144	1.15	122.553	60.82
2	10.107	0.95	443.780	61.69
3	0.864	0.83	725.280	62.43
4	0.949	21.03	722.820	59.76
5	1.023	42.83	720.613	57.17
6	1.085	63.30	718.813	54.98
7	1.133	110.00	717.400	50.68
8	1.169	151.47	716.373	47.55
9	1.203	217.99	715.393	43.46
10	1.234	323.87	714.480	38.63
11	1.250	436.82	714.027	34.93
12	1.262	540.06	713.680	32.38
13	10.810	16.50	421.533	58.58
14	10.713	34.69	424.633	55.53
15	10.641	51.52	426.907	53.08
16	10.592	86.46	428.447	48.77
17	10.565	122.86	429.320	45.17
18	10.544	172.50	430.000	41.29
19	10.531	262.60	430.387	36.19
20	10.520	341.25	430.767	33.07
21	10.499	430.12	431.413	30.42
22	20.672	13.31	105.720	57.36
23	20.613	27.49	107.607	54.07
24	20.568	41.88	109.040	51.21
25	20.534	67.66	110.087	46.98
26	20.505	95.26	111.033	43.38
27	20.482	138.17	111.760	39.09
28	20.462	204.25	112.387	34.44
29	20.450	273.72	112.753	31.07
30	20.440	344.86	113.080	28.56
31	30.402	10.82	-196.767	56.20
32	30.386	22.45	-196.260	52.65
33	30.380	34.04	-196.100	49.66
34	30.381	56.06	-196.100	45.06
35	30.385	79.35	-196.247	41.30
36	30.392	112.91	-196.433	37.22
37	30.409	167.14	-196.953	32.66
38	30.416	227.18	-197.180	29.24
39	30.422	284.31	-197.340	26.97

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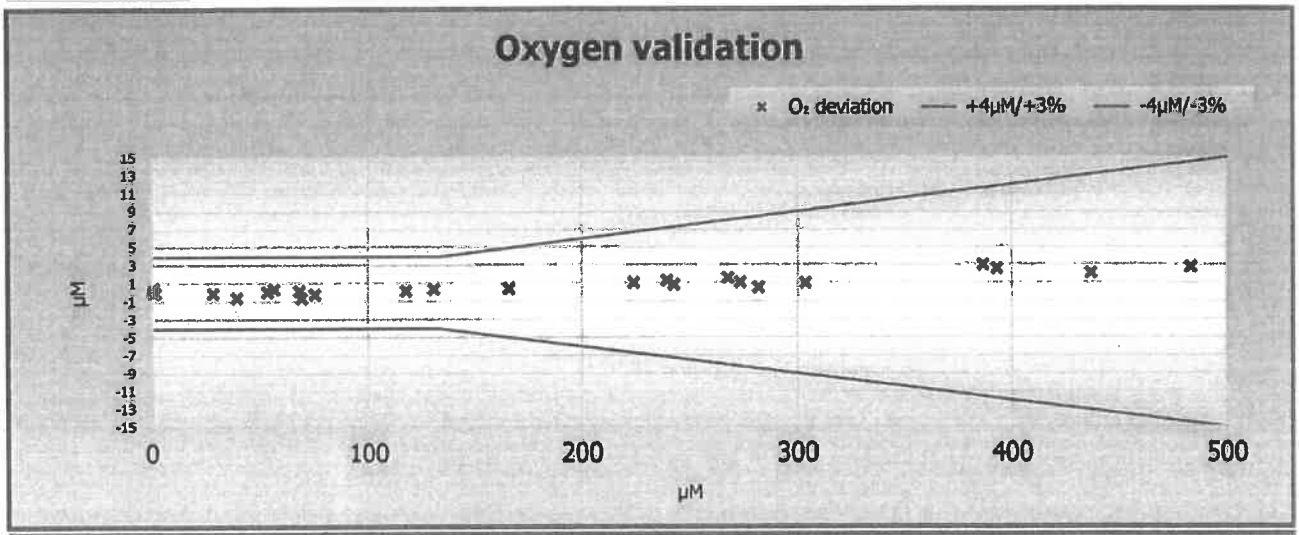
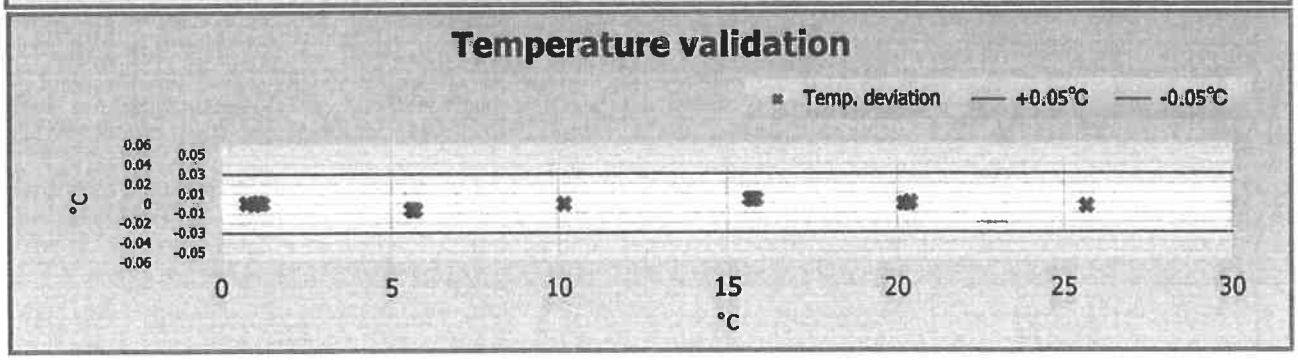
Giving these coefficients

Index	0	1	2	3	4	5	6
SVUFoilCoef	2.74901E-03	1.14724E-04	2.37094E-06	1.57459E02	-2.56776E-01	-3.64971E01	3.17565E00
TempCoef	2.40020E01	-3.17751E-02	2.97410E-06	-4.34277E-09	0.00000E00	0.00000E00	





With following settings

Index	0	1	2	3
PhaseCoef	-1.59600E00	1.00000E00	0.00000E00	0.00000E00

Index	0 (Offset)	1 (Slope)
ConcCoef	0.00000E00	1.00000E00
Salinity	0.00	
Firmware Version	5.3.1	

Date:14.02.2021

Tor-Ove Kvalvaag

Tor-Ove Kvalvaag, Calibration Engineer

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TEST & SPECIFICATIONS

Form No. 712 V3, May 2020

Program Version: 5.3.1

Product: Oxygen Optode 4831IW
Serial No: 954

Visual and Mechanical Checks:

1.1	Soldering quality		
1.2	Visual surface		
1.3	Galvanic isolation between housing and electronics		

Current Drain and Voltages:

2.1	Average current drain at 0.5 Hz sampling (Max.: 33 mA)	22.9	mA
2.2	CANBus Current drain at 0.5 Hz sampling (Max.: 33 mA)		mA
2.3	Current drain in sleep (Max.: 270 µA)	255	µA
2.4	CANBus Current drain in sleep (Max.: 180 µA)		µA
2.5	DSP IO voltage, J4.18 (3.3 ±0.15V)	3.28	V
2.6	DSP Core voltage, J4.17(1.8 ±0.05 V)	1.82	V
2.7	Excitation driver voltage, C4 Analog Board (4.3 ±0.1 V)	4.34	V

Performance test:	Channel:	Blue		Red	
3.1	Average of Receiver readings (0±150mV)	3.4	mV	3.1	mV
3.2	Standard Deviation of Receiver readings (Max.: 45mV/10mV)	0.98	mV	0.26	mV
3.3	Amplitude measurement with non-fluorescence foil (<60mV/650-1200mV)	8.4	mV	880.4	mV
3.4	CANBus Output test				

Function test from 0 to 40°C:	Channel:	Blue		Red	
4.1	Minimum amplitude measurement (Blue: >550 mV, Red >550 mV)	737.6	mV	754.7	mV
4.2	Maximum amplitude measurement (Blue: <1600 mV, Red <1400 mV)	1136.8	mV	1169.5	mV
4.3	Minimum phase measurement (Blue: >32°, Red: >3°)	34.09	°	6.31	°
4.4	Maximum phase measurement (Blue: <45°, Red: <10°)	39.86	°	7.72	°
4.5	Maximum standard deviation of Phase measurement: (< 0.07°)	0.05	°	0.04	°
4.6	Minimum temperature raw data measurement: (<-200 mV)			-488.1	mV
4.7	Maximum temperature raw data measurement: (>450 mV)			629.2	mV

Date: 11 Feb 2021

Sign:
Laila A. Skålnes

Laila Skålnes, Production Engineer

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PRESSURE CERTIFICATE

Form No. 667, Sept 2009

Product: Oxygen Optode 4831IW
Serial No: 954
Date: 11.02.2021

Certificate No: 181486260954

This is to certify that this product has been pressure tested with the following instrument, and we confirm that no irregularities were found during the test:

Autoklav 800 bar – sn: 0210005

Pressure readings:

Pressure (Bar)	Pressure time (hour)
300	1

Date: 11 Feb 2021

Sign:
Laila A. Skålnes

Laila Skålnes, Production Engineer