CALIBRATION SHEETS

SEA-BIRD ELECTRONICS, INC.

13431 NE 20th Street, Bellevue, Washington, 98005-2010 USA
Phone: (425) 643 - 9866 Fax (425) 643 - 9954 Email: seabird@seabird.com

SENSOR SERIAL NUMBER: 6799
CALIBRATION DATE: 19-Mar-11

SBE19plus CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

g = -9.817477e-001
h = 1.543341e-001
i = -2.865057e-004
j = 4.542234e-005

CPcor = -9.5700e-008
CTcor = 3.2500e-006

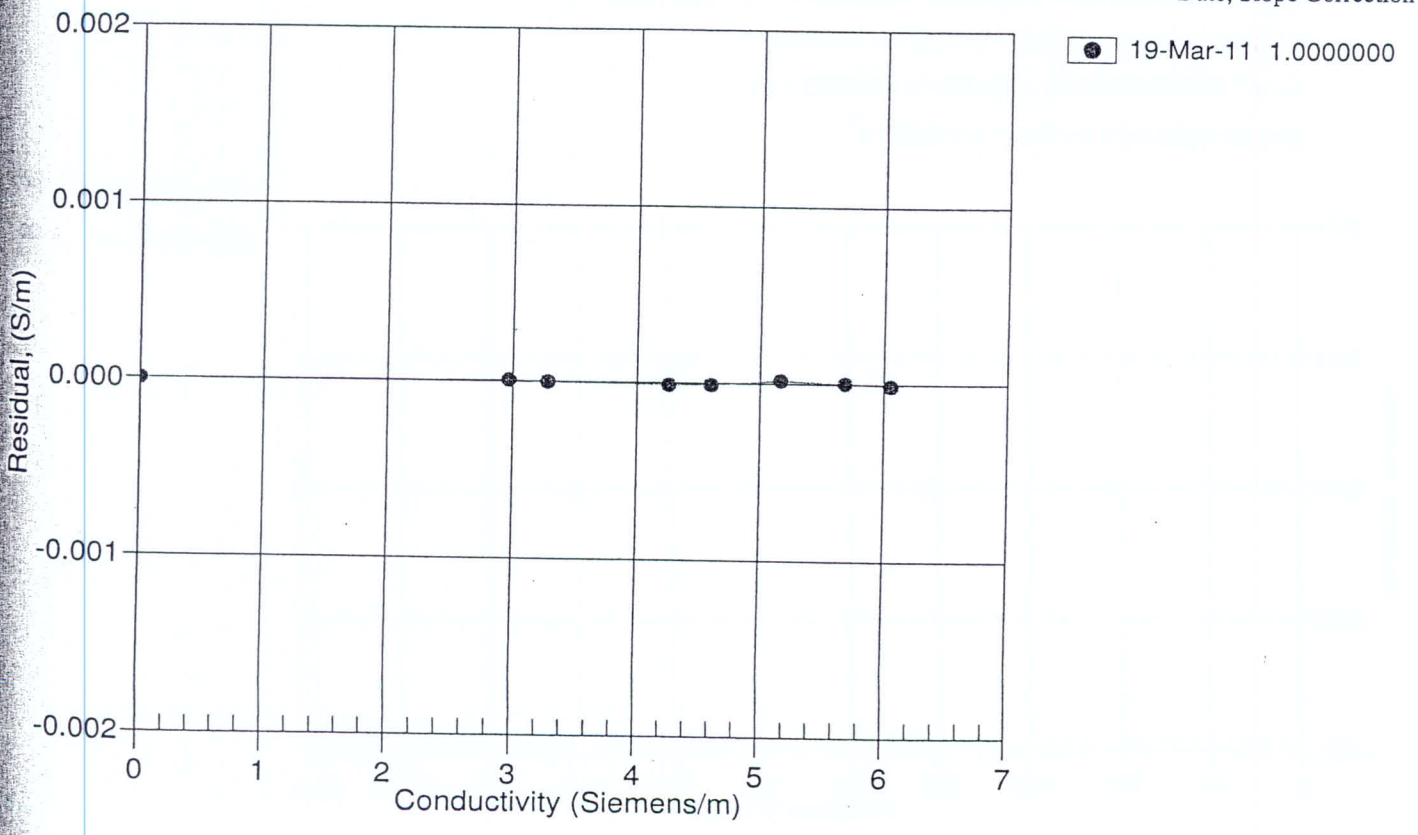
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREO (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2525.69	0.0000	0.00000
1.0000	34.7633	2.97187	5066.05	2.9719	0.00001
4.5000	34.7436	3.27854	5258.28	3.2785	-0.00000
15.0000	34.7013	4.25900	5829.77	4.2590	-0.00001
18.5000	34.6922	4.60368	6017.54	4.6037	-0.00001
24.0000	34.6821	5.16087	6308.99	5.1609	0.00002
29.0000	34.6765	5.68199	6569.55	5.6820	0.00000
32.5000	34.6725	6.05374	6749.09	6.0537	-0.00001

f = INST FREQ / 1000.0

Conductivity = $(g + hf^2 + if^3 + jf^4) / (1 + \delta t + \varepsilon p)$ Siemens/meter

t = temperature[°C)]; p = pressure[decibars]; δ = CTcor; ε = CPcor;

Residual = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 6799
CALIBRATION DATE: 16-Mar-11

SBE19plus PRESSURE CALIBRATION DATA
508 psia S/N 3220268

COEFFICIENTS:

PA0 =	-4.400047e-002	PTCA0 =	5.245069e+005
PA1 =	1.540632e-003	PTCA1 =	3.930707e-001
PA2 =	6.939975e-012	PTCA2 =	-8.460710e-002
PTEMPA0 =	-6.409163e+001	PTCB0 =	2.508912e+001
PTEMPA1 =	5.294466e+001	PTCB1 =	-5.750000e-004
PTEMPA2 =	-2.620123e-001	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.54	533935.0	1.6	14.54	-0.00
104.78	592469.0	1.6	104.79	0.00
204.82	657304.0	1.6	204.82	0.00
304.80	722072.0	1.6	304.80	0.00
404.82	786821.0	1.6	404.81	-0.00
504.82	851533.0	1.6	504.82	0.00
404.83	786837.0	1.6	404.84	0.00
304.83	722091.0	1.6	304.83	0.00
204.83	657308.0	1.6	204.83	-0.00
104.82	592488.0	1.6	104.82	-0.00
14.54	533937.0	1.6	14.54	-0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	1.84	534086.47
29.00	1.77	534105.78
24.00	1.68	534126.00
18.50	1.57	534142.30
15.00	1.50	534150.67
4.50	1.30	534163.34
1.00	1.24	534165.59

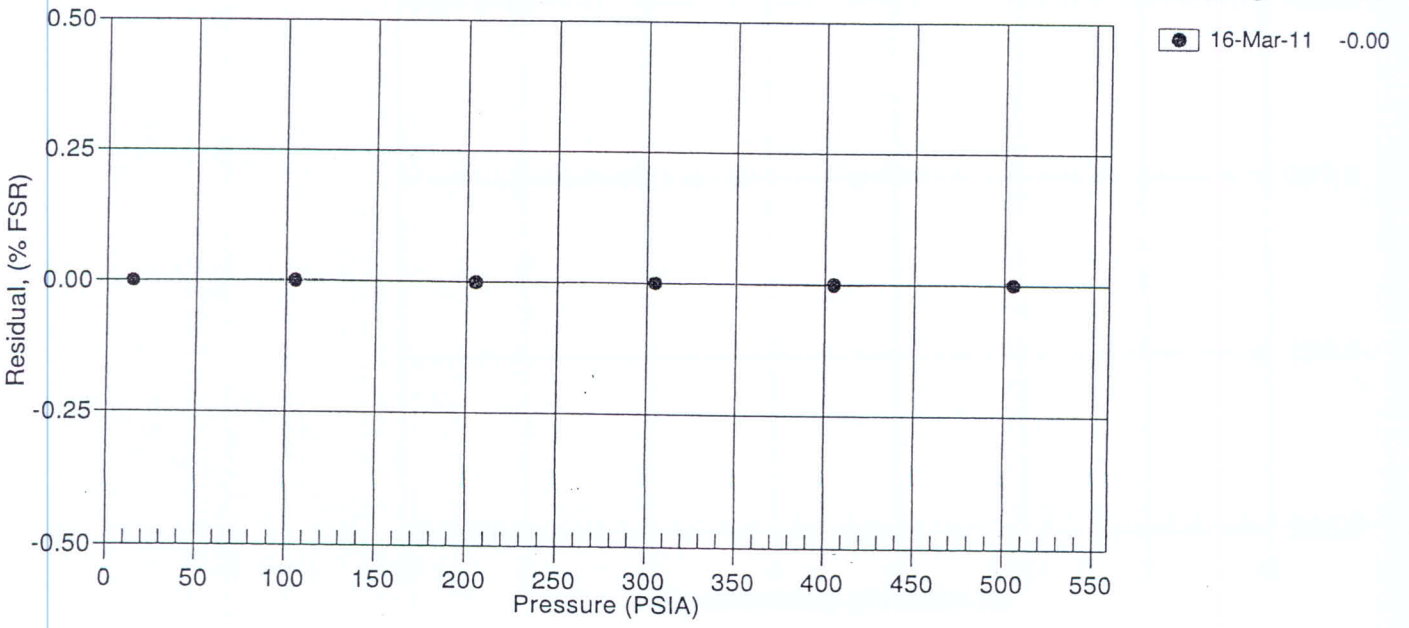
TEMP(ITS90)	SPAN(mV)
-5.00	25.09
35.00	25.07

y = thermistor output; $t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$

x = pressure output - $PTCA0 - PTCA1 * t - PTCA2 * t^2$

$n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$

pressure (psia) = $PA0 + PA1 * n + PA2 * n^2$



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SBE19plus TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

ITS-90 COEFFICIENTS

a0 = 1.261360e-003
a1 = 2.604369e-004
a2 = -2.998751e-007
a3 = 1.497527e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT(n)	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	676751.424	1.0000	0.0000
4.5000	602194.898	4.5000	-0.0000
15.0000	415387.576	15.0001	0.0001
18.5000	364878.831	18.5000	-0.0000
24.0000	296136.237	24.0000	0.0000
29.0000	243721.525	29.0000	0.0000
32.5000	212045.508	32.5000	-0.0000

MV = (n - 524288) / 1.6e+007
R = (MV * 2.900e+009 + 1.024e+008) / (2.048e+004 - MV * 2.0e+005)
Temperature ITS-90 = $1/\{a0 + a1[ln(R)] + a2[ln^2(R)] + a3[ln^3(R)]\} - 273.15$ (°C)

Residual = instrument temperature - bath temperature