



SEA-BIRD
SCIENTIFIC

Sea-Bird Scientific
13431 NE 20th Street
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Pressure Test Certificate

Test Date: 2019-02-19

Description: Slocum CTD

Sensor Information:

Model Number: Slocum

Serial Number: 9507

Pressure Test Protocol:

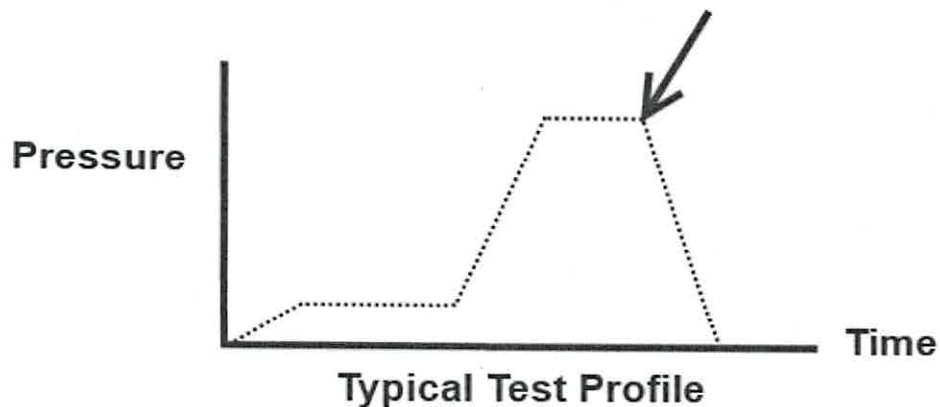
Low Pressure Test: 40 PSI Held For: 15 Minutes

High Pressure Test: 1450 PSI Held For: 15 Minutes

Passed Test: True

Tested By: TH

High pressure is generally equal to the maximum depth rating of the instrument





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SENSOR SERIAL NUMBER: 9507
 CALIBRATION DATE: 02-Jan-19

Slocum Payload CTD PRESSURE CALIBRATION DATA
 1450 psia S/N 11177054

COEFFICIENTS:

PA0 =	1.578719e-001	PTCA0 =	5.238833e+005
PA1 =	4.497605e-003	PTCA1 =	-3.843639e-001
PA2 =	-1.023393e-011	PTCA2 =	8.567026e-002
PTEMPA0 =	-6.884745e+001	PTCB0 =	2.511713e+001
PTEMPA1 =	5.139156e-002	PTCB1 =	6.250000e-004
PTEMPA2 =	-4.430154e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE (PSIA)	INSTRUMENT OUTPUT (counts)	THERMISTOR OUTPUT (volts)	COMPUTED PRESSURE (PSIA)	RESIDUAL (%FSR)	TEMP (°C)	THERMISTOR OUTPUT (volts)	INSTRUMENT OUTPUT (counts)
14.67	527149.4	1817.9	14.67	0.00	32.50	2007	527244.50
301.76	591025.9	1820.3	301.75	-0.00	29.00	1936	527231.00
588.79	654907.2	1821.0	588.77	-0.00	24.00	1836	527211.60
875.98	718852.9	1821.7	875.99	0.00	18.50	1725	527186.40
1163.12	782800.7	1822.3	1163.14	0.00	15.00	1656	527177.50
1450.21	846746.5	1823.0	1450.19	-0.00	4.50	1445	527179.10
1163.15	782806.2	1822.3	1163.16	0.00	1.00	1375	527160.80
876.03	718864.7	1822.8	876.04	0.00			
588.74	654893.2	1822.1	588.70	-0.00			
301.76	591036.4	1822.5	301.79	0.00	TEMPERATURE (°C)	SPAN	
14.66	527146.3	1823.2	14.65	-0.00	-5.00	25.11	
					35.00	25.14	

y = thermistor output (counts)

$$t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$$

$$x = \text{instrument output} - PTCA0 - PTCA1 * t - PTCA2 * t^2$$

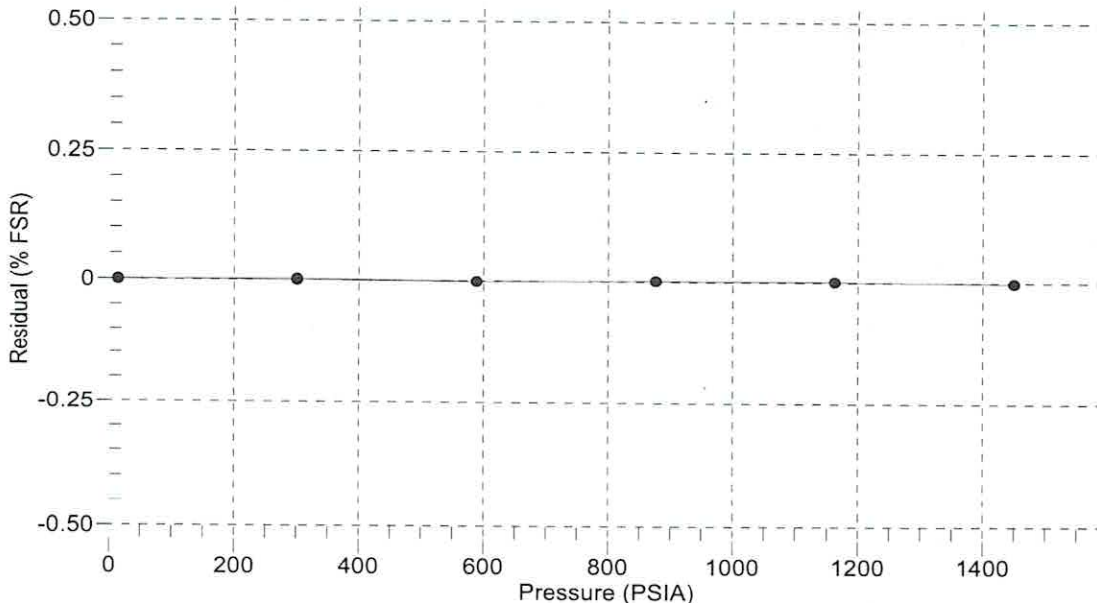
$$n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$$

$$\text{pressure (PSIA)} = PA0 + PA1 * n + PA2 * n^2$$

$$\text{Residual (\%FSR)} = (\text{computed pressure} - \text{true pressure}) * 100 / \text{Full Scale Range}$$

Date, Offset (%FSR)

● 02-Jan-19 0.00





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SENSOR SERIAL NUMBER: 9507
CALIBRATION DATE: 13-Jan-19

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

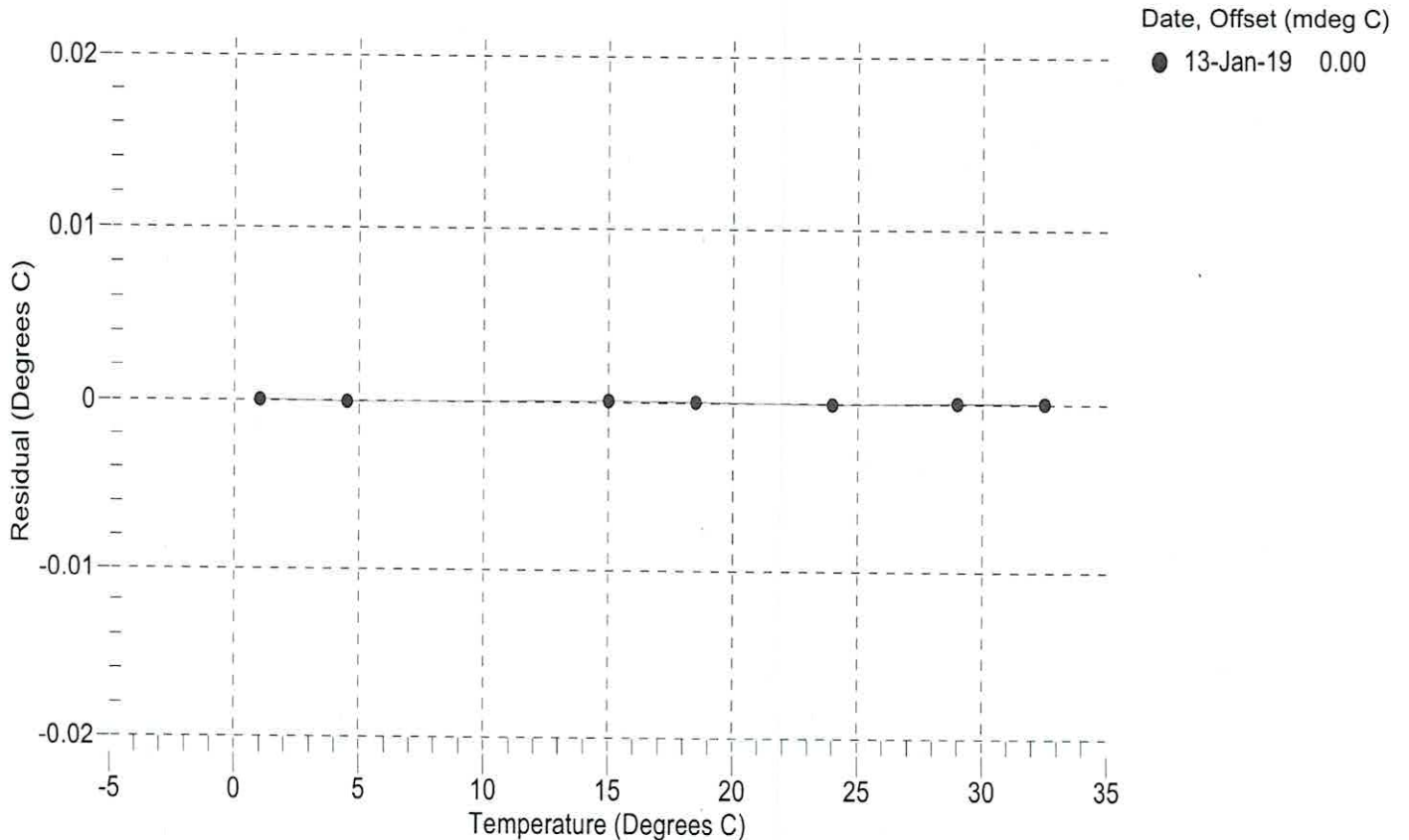
a0 = -1.673704e-004
a1 = 3.202588e-004
a2 = -5.412757e-006
a3 = 2.247420e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	566265.1	1.0000	0.0000
4.4999	484444.1	4.4998	-0.0001
15.0000	309344.3	15.0001	0.0001
18.5000	268057.0	18.5000	0.0000
24.0000	215311.2	23.9999	-0.0001
29.0000	177507.9	29.0000	0.0000
32.5000	155589.4	32.5000	0.0000

n = Instrument Output (counts)

$$\text{Temperature ITS-90 (°C)} = 1/\{a_0 + a_1[\ln(n)] + a_2[\ln^2(n)] + a_3[\ln^3(n)]\} - 273.15$$

$$\text{Residual (°C)} = \text{instrument temperature} - \text{bath temperature}$$





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

COEFFICIENTS:

g = -1.010309e+000	CPcor = -9.5700e-008
h = 1.398052e-001	CTcor = 3.2500e-006
i = -1.688185e-004	WBOTC = 3.0972e-007
j = 3.295485e-005	

BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2690.29	0.00000	0.00000
1.0000	34.9195	2.98394	5344.36	2.98394	-0.00001
4.4999	34.9003	3.29186	5545.80	3.29186	0.00000
15.0000	34.8595	4.27635	6144.91	4.27636	0.00001
18.5000	34.8514	4.62252	6341.85	4.62253	0.00001
24.0000	34.8425	5.18209	6647.55	5.18207	-0.00002
29.0000	34.8378	5.70544	6920.94	5.70545	0.00001
32.5000	34.8349	6.07887	7109.43	6.07895	0.00008

$f = \text{Instrument Output(Hz)} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$
 $t = \text{temperature (°C)}$; $p = \text{pressure (decibars)}$; $\delta = \text{CTcor}$; $\epsilon = \text{CPcor}$;
 $\text{Conductivity (S/m)} = (g + h * f^2 + i * f^3 + j * f^4) / (1 + \delta * t + \epsilon * p)$
 $\text{Residual (Siemens/meter)} = \text{instrument conductivity} - \text{bath conductivity}$

