

APPENDIX F
VIBRATING WIRE PIEZOMETER CALIBRATION SHEETS

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FIGURES

Vibrating Wire Pressure Transducer Calibration Reports (4 sheets)



48 Spencer St. Lebanon, N.H. 03766 USA

Vibrating Wire Pressure Transducer Calibration Report

Type: SDate of Calibration: January 7, 2011Serial Number: 1040564Temperature: 24.1 °CPressure Range: 700 kPa†Barometric Pressure: 976.9 mbarCalibration Instruction: VW Pressure TransducersTechnician: *K. Rogers*

Applied Pressure (kPa)	Gage Reading 1st Cycle	Gage Reading 2nd Cycle	Average Gage Reading	Calculated Pressure (Linear)	Error Linear (%FS)	Calculated Pressure (Polynomial)	Error Polynomial (%FS)
0.0	8872	8872	8872	1.471	0.21	-0.050	-0.01
140.0	8113	8113	8113	139.8	-0.02	140.1	0.02
280.0	7351	7352	7352	278.7	-0.19	280.0	0.00
420.0	6583	6583	6583	418.8	-0.18	420.0	0.00
560.0	5810	5810	5810	559.7	-0.04	560.0	0.00
700.0	5032	5032	5032	701.5	0.22	700.0	0.00

(kPa) Linear Gage Factor (G): 0.1823 (kPa/ digit) Regression Zero: 8880Polynomial Gage Factors: A: -7.783E-07 B: -0.1715 C: 1582.6Thermal Factor (K): 0.0010 (kPa/ °C)(psi) Linear Gage Factor (G): 0.02644 (psi/ digit)Polynomial Gage Factors: A: -1.12889E-07 B: -0.02487 C: 229.54Thermal Factor (K): 0.00015 (psi/ °C)Calculated Pressures: Linear, $P = G(R_0 - R_1) + K(T_1 - T_0) - (S_1 - S_0)**$ Polynomial, $P = AR_1^2 + BR_1 + C + K(T_1 - T_0) - (S_1 - S_0)**$ †Barometric pressures are absolute. Barometric compensation is not required with vented and differential pressure transducers.**Factory Zero Reading:**

GK-401 Pos. B or F(R₀): 8863 Temp(T₀): 23.2 °C †Baro(S₀): 992.9 mbar Date: January 20, 2011
Dry 8863.8 22.2 11/29/11

*Initial zero readings must be established in the field following the procedures described in the Instruction Manual. If the Polynomial equation is used the field value of C must be calculated by plugging the initial zero reading into the polynomial equation with the value of P set to zero.

The above instrument was found to be in tolerance in all operating ranges.

The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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48 Spencer St. Lebanon, N.H. 03766 USA

Vibrating Wire Pressure Transducer Calibration Report

STRAP TO 150' LONG

12/16/11 INSTALLED WIRE IN BORING B-5 STRAPPED TO INCLIN. CASING - TIP UP (CUT TO 130' FROM TRANSDUCER)

Type: S

Date of Calibration: January 7, 2011

Serial Number: 1040580

- TRANSDUCER @ ~ 2.5' ABOVE BOTTOM OF PIPE =

Temperature: 24.1 °C

Pressure Range: 700 kPa

†Barometric Pressure: 976.9 mbar

12/16/11
07.55 DRY READING
08:30 WET " / PRE CUT - 8616.2 Dg / 12.5°C
" " / PRE CUT - 8601.4 / 8.2°C
" " / POST CUT - 8601.4 / 8.1°C

Calibration Instruction: VW Pressure Transducers

Technician: *[Signature]*

Applied Pressure (kPa)	Gage Reading 1st Cycle	Gage Reading 2nd Cycle	Average Gage Reading	Calculated Pressure (Linear)	Error Linear (%FS)	Calculated Pressure (Polynomial)	Error Polynomial (%FS)
0.0	8630	8630	8630	0.064	0.01	0.113	0.02
140.0	7855	7855	7855	139.8	-0.02	139.8	-0.02
280.0	7078	7078	7078	280.0	0.00	279.9	-0.01
420.0	6301	6301	6301	420.1	0.02	420.1	0.01
560.0	5524	5525	5525	560.2	0.02	560.2	0.03
700.0	4750	4750	4750	699.8	-0.02	699.9	-0.02

(kPa) Linear Gage Factor (G): 0.1804 (kPa/ digit) Regression Zero: 8630

Polynomial Gage Factors: A: 2.406E-08 B: -0.1807 C: 1557.6

Thermal Factor (K): 0.0375 (kPa/ °C)

(psi) Linear Gage Factor (G): 0.02616 (psi/ digit)

Polynomial Gage Factors: A: 3.48964E-09 B: -0.02621 C: 225.91

Thermal Factor (K): 0.00544 (psi/ °C)

Calculated Pressures: Linear, $P = G(R_0 - R_1) + K(T_1 - T_0) - (S_1 - S_0)**$

Polynomial, $P = AR_1^2 + BR_1 + C + K(T_1 - T_0) - (S_1 - S_0)**$

†Barometric pressures are absolute. Barometric compensation is not required with vented and differential pressure transducers.

Factory Zero Reading:

GK-401 Pos. B or F(R₀): 8620 Temp(T₀): 23.6 °C †Baro(S₀): 992.9 mbar Date: January 20, 2011

*Initial zero readings must be established in the field following the procedures described in the Instruction Manual. If the Polynomial equation is used the field value of C must be calculated by plugging the initial zero reading into the polynomial equation with the value of P set to zero.

The above instrument was found to be in tolerance in all operating ranges.

The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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48 Spencer St. Lebanon, N.H. 03766 USA

Vibrating Wire Pressure Transducer Calibration Report

Type: S

Date of Calibration: January 7, 2011

Serial Number: 1040576

Temperature: 24.1 °C

Pressure Range: 700 kPa

†Barometric Pressure: 976.9 mbar

Calibration Instruction: VW Pressure Transducers

Technician: *[Signature]*

Applied Pressure (kPa)	Gage Reading 1st Cycle	Gage Reading 2nd Cycle	Average Gage Reading	Calculated Pressure (Linear)	Error Linear (%FS)	Calculated Pressure (Polynomial)	Error Polynomial (%FS)
0.0	8880	8881	8881	1.430	0.20	0.235	0.03
140.0	8092	8092	8092	139.5	-0.08	139.7	-0.04
280.0	7294	7295	7295	279.1	-0.13	280.2	0.03
420.0	6496	6496	6496	418.9	-0.16	419.9	-0.01
560.0	5690	5690	5690	560.0	0.00	560.2	0.03
700.0	4883	4884	4884	701.2	0.17	700.0	-0.01

(kPa) Linear Gage Factor (G): 0.1751 (kPa/ digit) **Regression Zero:** 8889

Polynomial Gage Factors: A: -6.061E-07 B: -0.1667 C: 1528.5

Thermal Factor (K): 0.0187 (kPa/ °C)

(psi) Linear Gage Factor (G): 0.02539 (psi/ digit)

Polynomial Gage Factors: A: -8.7909E-08 B: -0.02418 C: 221.69

Thermal Factor (K): 0.00271 (psi/ °C)

Calculated Pressures: **Linear, $P = G(R_0 - R_1) + K(T_1 - T_0) - (S_1 - S_0)**$**

Polynomial, $P = AR_1^2 + BR_1 + C + K(T_1 - T_0) - (S_1 - S_0)$**

†Barometric pressures are absolute. Barometric compensation is not required with vented and differential pressure transducers.

Factory Zero Reading:

GK-401 Pos. B or F(R₀): 8873 Temp(T₀): 23.3 °C †Baro(S₀): 992.9 mbar Date: January 20, 2011

*Initial zero readings must be established in the field following the procedures described in the Instruction Manual. If the Polynomial equation is used the field value of C must be calculated by plugging the initial zero reading into the polynomial equation with the value of P set to zero.

The above instrument was found to be in tolerance in all operating ranges.
The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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48 Spencer St. Lebanon, N.H. 03766 USA

WHITE PT. LANDSLIDE
 B-9 @ 114.1' B.G.S.
 51-110052-002

Vibrating Wire Pressure Transducer Calibration Report

Type: SDate of Calibration: January 7, 2011Serial Number: 1040566Temperature: 24.1 °CPressure Range: 700 kPa†Barometric Pressure: 976.9 mbarCalibration Instruction: VW Pressure TransducersTechnician: *[Signature]*

Applied Pressure (kPa)	Gage Reading 1st Cycle	Gage Reading 2nd Cycle	Average Gage Reading	Calculated Pressure (Linear)	Error Linear (%FS)	Calculated Pressure (Polynomial)	Error Polynomial (%FS)
0.0	8851	8851	8851	1.800	0.26	0.121	0.02
140.0	8071	8071	8071	139.6	-0.06	139.9	-0.01
280.0	7286	7286	7286	278.3	-0.25	279.6	-0.05
420.0	6489	6490	6490	419.0	-0.14	420.5	0.06
560.0	5693	5693	5693	559.7	-0.04	560.1	0.01
700.0	4890	4890	4890	701.6	0.22	699.9	-0.02

(kPa) Linear Gage Factor (G): 0.1767 (kPa/ digit) Regression Zero: 8861

Polynomial Gage Factors: A: -8.088E-07 B: -0.1655 C: 1528.8

Thermal Factor (K): 0.0367 (kPa/ °C)

(psi) Linear Gage Factor (G): 0.02562 (psi/ digit)

Polynomial Gage Factors: A: -1.17307E-07 B: -0.02401 C: 221.73

Thermal Factor (K): 0.00533 (psi/ °C)

Calculated Pressures:

Linear, $P = G(R_0 - R_1) + K(T_1 - T_0) - (S_1 - S_0)^{**}$

Polynomial, $P = AR_1^2 + BR_1 + C + K(T_1 - T_0) - (S_1 - S_0)^{**}$

†Barometric pressures are absolute. Barometric compensation is not required with vented and differential pressure transducers.

Factory Zero Reading:

GK-401 Pos. B or F(R₀): 8845 Temp(T₀): 23.5 °C †Baro(S₀): 992.9 mbar Date: January 20, 2011

*Initial zero readings must be established in the field following the procedures described in the Instruction Manual. If the Polynomial equation is used the field value of C must be calculated by plugging the initial zero reading into the polynomial equation with the value of P set to zero.

The above instrument was found to be in tolerance in all operating ranges.
 The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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