

Verification for Morehouse Calibration Software

1. Verify the B coefficients are entered correctly from the calibration report.
2. Verify the mV/V values from fitted curve produce the appropriate applied load. In this example, when 0.05152 mV/V is displayed the corresponding output on the Morehouse software should be 50.0
3. Morehouse has verified the software using several Coefficient files and a load cell simulator. In this example We are using excel versus the calibration report to verify the formula for 0.05152 mV/V we get 50.00. This matches the calibration report.

Predicted Response	LOAD APPLIED
0.05152	50.00
0.08000	77.66
1.19983	1165.13
1.99970	1941.99
2.39966	2330.47

This Calibration Data is Certified Traceable to the United States National Institute of Standards & Technology

MODEL: CALIBRATION
 MOREHOUSE Load Cell, SERIAL NO.
 2050.00 LBF Tension Calibrated to 2050.00 LBF
 MOREHOUSE 4215, SERIAL NO.

Calibration is in Accordance with ASTM E74-13
 Ascending Tension DATA

Applied Load	Deflection Values Per ASTM Method 8.1B Interpolated Zero			Deviation From Fitted Curve			Values From Fitted Curve
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	
LBF	mV/V	mV/V	mV/V	mV/V	mV/V	mV/V	mV/V
50	0.05153	0.05150	0.05151	0.00001	-0.00002	-0.00001	0.05152
200	0.20501	0.20504	0.20508	0.00002	0.00005	-0.00001	0.20509
400	0.41196	0.41192	0.41191	0.00001	-0.00003	-0.00004	0.41195
600	0.61791	0.61788	0.61789	0.00001	-0.00002	-0.00001	0.61790
800	0.82389	0.82385	0.82381	0.00004	0.00000	-0.00004	0.82385
1000	1.02981	1.02980	1.02977	0.00002	0.00001	-0.00002	1.02979
1200	1.23575	1.23576	1.23573	0.00002	0.00003	0.00000	1.23573
1400	1.44165	1.44167	1.44166	-0.00001	0.00001	0.00000	1.44166
1600	1.64761	1.64760	1.64756	0.00002	0.00001	-0.00003	1.64759
1800	1.85350	1.85353	1.85351	-0.00001	0.00002	0.00000	1.85351
2000	2.05942	2.05944	2.05942	-0.00001	0.00001	-0.00001	2.05943
2050	2.11092	2.11091	2.11089	0.00001	0.00000	-0.00002	2.11091

The following polynomial equation, described in ASTM E74-13 has been fitted to the force and deflection values obtained in the calibration using the method of least squares.
 $response = A0 + A1(load) + A2(load)^2$ $load = B0 + B1(response) + B2(response)^2$
 Where: A0 2.58013013E-5 Where: B0 -2.50426015E-2
 A1 1.02983422E-3 B1 9.71030000E+2
 A2 -6.6549482E-11 B2 6.0986693E-2

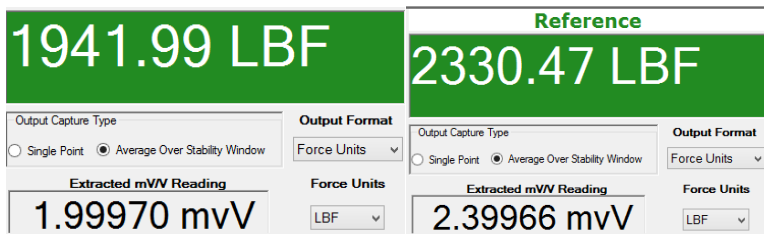
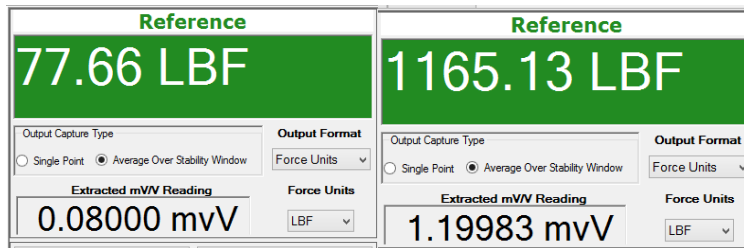
These are what are entered into the software

The following values as defined in ASTM E74-13 were determined from the calibration data.
 Lower Limit Factor, LLF 0.049 LBF

Class A Loading Range 50.00 TO 2050.00 LBF

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4. The next section is actual screen grabs using the predicted response versus and verifying these against the equation we just verified in Microsoft excel.



This verification was performed on 6/5/2015 using the sample report, Microsoft excel versus the sample report and then actual "live" software screenshots were taken with a Morehouse 4215 and load cell simulator by Henry Zumbrun.