Management Procedure 2571
Revision: B
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Calibration Procedure

DeFelsko Corporation

PosiTest Digital AT

Adhesion Tester

Table of Contents

1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of the DeFelsko Adhesion Testers, PosiTest AT. Table 1-1 shows the measurement ranges.

Table 1-1 Measurement Ranges

Gage	Measurement Range
AT	0 to 3000 psi

Table 1-2 Calibration Requirements and Description

Gage	Performance Specifications	Test Method
AT	± 1% of full measurement range	Compare to Load Cell Assembly.

2 Measurement Standards and Support Equipment Performance Requirements

2.1 Minimum-Use-Specifications are the calculated minimum performance specifications required for the measurement standards and support equipment to be utilized for comparison measurements required in the Calibration Process.

2.2 The Minimum-Use-Specifications are developed through uncertainty analysis and are calculated through assignment of a defined and documented uncertainty ratio or margin between the specified tolerances of the Unit-Under-Calibration (UUC) and the capabilities (uncertainty specifications) required of the measurement standards system.

2.3 The uncertainty ratios applied in this Calibration Procedure are 4:1 or better.

Table 2-1 Calibration Environmental and Warm Up Requirements

Measurement Standards & Support Equipment Environmental Requirements:	Load Cell Temperature: 23 ± 5° C. Relative Humidity: Less than 95%
Measurement Standards & Support Equipment Warm-up and Stabilization Requirements:	Pressurize system to maximum of range and release prior to use

Table 2-2 Measurement Standards & Support Equipment Performance Requirements

Equipment Generic	Minimum-Use-Specifications		Manufacturer/Model #'s
	Manufacturing Specifications		
Name (Quantity)	Range	Accuracy	Applicable
Measurement system (load cell + meter)	0 - 1500lbs	+/- 0.24% F.S	Transducer Techniques Meter DPM-3, Sensor SBO-5K
	0 – 5000 lbs	+/- 0.06% F.S.	

3 Preliminary Operations

Note: Review the entire document before starting the calibration process.

3.1 Visual Inspection

3.1.1 Visually inspect the UUC for:

- Hydraulic fluid leaks
- Cracked or broken hoses, fittings, dial, pump or actuator
- Proper identification

3.1.2 Damage or excess wear should be repaired prior to beginning the calibration process.

4 Calibration Process

4.1 Setup

4.1.1 Setup Pressure system of the UUC per the PosiTest Adhesion Tester instruction manual.

4.1.2 Setup the Load Cell per manufacturer's instructions. The DPM should be scaled to show 0.1 lb increments.

4.1.3 Screw in the 20mm threaded dolly to top of Load Cell. Leave enough clearance to attach quick coupling and actuator standoff.

4.1.4 Attach the quick coupling of the UUC's actuator to the dolly on the load cell.

4.2 Accuracy Measurement

4.2.1 Pump the unit to full pressure and then release pressure and allow the load cell to stabilize.

4.2.2 Zero the display on the DPM.

4.2.3 Zero the adhesion tester.

4.2.4 Pump handle to generate pressure per directions in manual. Record the "Actual Load Cell Reading" and "UUC Reading" values per table in section 5.

4.2.5 Verify all test results are within the tolerance.

4.2.6 If the differences between the UUC and load cell readings are consistently positive or negative, then re-zero the UUC and repeat.

5 Performance Requirements

Note: The technician should collect the data needed to complete the Actual Load Cell Reading and UUC Reading columns of the appropriate table below. After converting load cell readings by dividing by 0.487 to convert from the "lbs" displayed by the load cell to "psi", results are to be documented in the applicable Calibration Certificate. Do not write in this procedure.

Table 5-1 Performance Requirements and Calibration Data for PosiTest Digital AT

Nominal Gage Indicator	Actual Load Cell Reading	Converted Load Cell Reading❶	UUC Reading	Differential (max. 30 psi) ❷
psi	lbs	psi	psi	psi
500				
1000				
1500				
2000				
2500				
3000				

❶ Calculation: Actual Load Cell Reading (lbs) / 0.487 (piston area in^2) = Converted Load Cell Reading (psi)

❷ Calculation: Converted load cell reading– UUC reading = Differential. Tolerance 30 psi = 1% * 3000psi

Example: When attempting to hit the 500 psi target the operator actually achieves 505 psi (per the UUC gage) and the load cell reads 248 lbs. Calculating the converted load cell value in psi is: 248 lbs / 0.487 in^2 = 509 psi. The differential is 509 – 505 = 4 psi. The UUC is in tolerance for this point.

Nominal Gage Indicator	Actual Load Cell Reading	Converted Load Cell Reading❶	UUC Reading	Differential (max. 30 psi) ❷
psi	lbs	psi	psi	psi
500	248	509	505	4

Management Procedure Change Notice

Procedure Number: 2571
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Reason for Change:

- Revised to correct information in tables.

Description of Change:

- Updated table 1-2 to read "± 1% of full measurement range" instead of "+/-1% of reading full scale"
- In table 2-2 changed range to read 5000 instead of 9999. Changed accuracy to +/- 0.06% instead of –0.01% this is 0.05% for load cell nonlinearity, hysteresis is not a factor because of rezeroing, plus 0.01% for DPM-3.
- Removed requirement to measure load cell temperature, added 4.2.1 text
- Removed note after 4.2.5 on ability of load cell and UUC to output readings digitally.
- Completely revised table 5-1 and associated notes and example.