



Management Procedure 2502
Revision: A
Date Issued: October 21, 1998
Date Revised: October 21, 1998

Calibration Procedure

DeFelsko Corporation

PosiTest G
PosiTest GM
PosiTest F
PosiTest FM

Coating Thickness Gages

Section I.

1.0 Introduction and UUC Performance Requirements

This procedure describes the calibration of DeFelsko Corporation Coating Thickness Gages, PosiTest G, PosiTest GM, PosiTest F, and PosiTest FM. These gages have the following ranges:

Table 1-1
Measurement Ranges

Gage	Measurement Range
PosiTest G	0-200 microns
PosiTest GM	0-8 mils
PosiTest F	0-2000 microns
PosiTest FM	0-80 mils

The unit being calibrated will be referred to as the UUC (unit-under-calibration).

UUC Environmental Range: Temperature: $23 \pm 5^{\circ}$ C. Relative Humidity: Up to 95%

UUC Warm-up and Stabilization Period requirements: Does not apply.

Table 1-2
UUC Calibration Requirements and Calibration Description

Unit-Under-Test (UUC) Parameter or Function	Performance Specifications	Notes	Test Method
1.1 Verifying Probe Balance	Does Not Apply	1	Visually inspected for proper balance.
1.2 Accuracy Test			Compared to Coating Thickness Reference Standards.
PosiTest G	0 to 20 $\mu\text{m} \pm 1 \mu\text{m}$ 20 μm - 200 $\mu\text{m} \pm 5\%$ of reading		
PosiTest GM	0 to 0.8 mils ± 0.04 mils 0.8 mils - 8.0 mils $\pm 5\%$ of reading		
PosiTest F	0 to 100 $\mu\text{m} \pm 5 \mu\text{m}$ 100 μm - 2000 $\mu\text{m} \pm 5\%$ of reading		
PosiTest FM	0 to 4.0 mils ± 0.2 mils 4.0 mils - 80 mils $\pm 5\%$ of reading		

Notes: 1 Functional specification. This is not considered in determining As-Received status. (In-tolerance or Out-of-tolerance)

Section II.

2.0 Measurement Standards and Support Equipment Performance Requirements

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.

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 UUC and the capabilities (uncertainty specifications) required of the measurement standards system.

The uncertainty ratio applied in this Calibration Procedure is 4:1 or better.

Caution: The instructions in this Calibration Procedure relate specifically to the equipment and conditions listed in Section II. If other equipment is substituted, the information and instructions must be interpreted accordingly.

Measurement Standards & Support Equipment Environmental Requirements:	Temperature: $23 \pm 5^\circ \text{C}$. Relative Humidity: Less than 95%
Measurement Standards & Support Equipment Warm-up and Stabilization Requirements:	Not Required

Table 2-1
Measurement Standards & Support Equipment
Performance Requirements

Equipment Generic Name (Quantity)	Minimum-Use-Specifications		Manufacturer/Model #'s Applicable
	Range	Accuracy	
2.1 Coating Thickness Reference Standards for the PosiTest G/GM	0-200 microns	± 0.25 microns	DeFelsko Corporation, Thickness Calibration Standards, Model CAL-S3
	0-8 mils		
Coating Thickness Reference Standards for the PosiTest F/FM	0-2000 microns	± 0.01 mils	DeFelsko Corporation, Thickness Calibration Standards, Model CAL-S1
	0-80 mils		

Section III.

3.0 Preliminary Operations

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

3.1 Visual Inspection

Visually inspect the UUC for:

- unreadable or damaged dial face
- damaged movement
- probe wear, pitting or coating
- worn feet
- cracked case
- proper identification

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

Section IV.

4.0 Calibration Process

Note: Whenever the test requirement is not met, verify the results of each test and take corrective action before proceeding.

4.1 Verifying Probe Balance

4.1.1 Turn the dial wheel fully counterclockwise (full scale) to the stop.

4.1.2 Invert the gage and observe that the probe tip floats freely. Rotate the gage sideways and vertically to ensure the probe tip floats freely in these positions as well. If the probe tip does not float freely, the gage will not operate accurately and must be returned for repair.

4.2 Accuracy Test

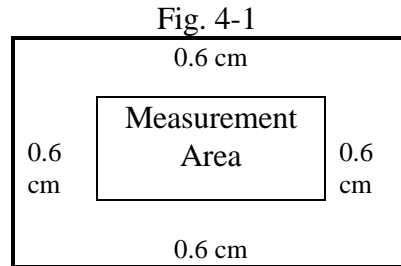
4.2.1 Select the Performance Requirements Table in Section V. that matches the model number of the gage being calibrated.

4.2.2 Using the appropriate Certificate of Calibration template for the UUC, record the reference material values on the form.

4.2.3 Determine the allowed range of readings using the calculation methods shown in columns D and E of Table 5-1 for the UUC.

4.2.4 Use the UUC to make readings of the applicable reference standard. Verify that the readings are within the allowable limits determined in 4.2.3. Record the reference standard values and the readings on the Certificate of Calibration.

In making readings the probe tip should be centered on the Coating Thickness Reference Standard. If not directly in the center, the reading should be taken at least 0.6 cm from the edge of the standard as shown in Figure 4-1.



Section V.

5.0 Performance Requirements

Note: The technician should collect the data needed to complete columns B and C of the appropriate table below. Do not write in this procedure.

Table 5-1A
Performance Requirements and Calibration Data for PosiTest G & GM

Nominal Thickness	Reference Standard	UUC Indication or Reading		
		Gage Measurement	Min. Reading Allowed	Max. Reading Allowed
A	B	C	D	E
0 mils	Uncoated	0 mils	minus 0.04 mils	plus 0.04 mils
0.25 mils			B minus 0.04 mils	B plus 0.04 mils
0.75 mils			B minus 0.04 mils	B plus 0.04 mils
3.0 mils			B times 0.95	B times 1.05

Table 5-1B
Performance Requirements and Calibration Data for PosiTest F & FM

Nominal Thickness	Reference Standard	UUC Indication or Reading		
		Gage Measurement	Min. Reading Allowed	Max. Reading Allowed
A	B	C	D	E
0 mils	Uncoated	0 mils	minus 0.2 mils	plus 0.2 mils
3.0 mils			B minus 0.2 mils	B plus 0.2 mils
10.0 mils			B times 0.95	B times 1.05
60.0 mils			B times 0.95	B times 1.05

* For metric readings convert using 1 mil = 25.4 microns