



Management Procedure 2591
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Calibration Procedure

DeFelsko Corporation

PosiTector 200 B & C

Coating Thickness Gage

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1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of the PosiTector 200 Coating Thickness Gage. The gage-probe combination has the following specifications:

Table 1-1 Measurement Ranges

Probe	Measurement Range
200 B	13 – 1000 μm 0.5 – 40 mils
200 C	50 - 3800 μm 2 – 150 mils

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

Table 1-2 UUC Calibration Requirements and Calibration Description

(UUC) Function	Performance Specifications	Test Method
Thickness Accuracy	Thickness in $\mu\text{m} \pm (2 \mu\text{m} + 3\% \text{ of reading})$ Thickness in mils $\pm (0.1 \text{ mils} + 3\% \text{ of reading})$	Compared to Reference Standards.

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

2.3 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 2. If other equipment is substituted, the information and instructions must be interpreted accordingly.

Table 2-1 Calibration Environmental and Warm-Up Requirements

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:	None

Table 2-2 Measurement Standards & Support Equipment Performance Requirements

Minimum-Use-Specification			
Probe	Range	Accuracy	Construction
B	0.5 - 40 mils	± 0.02 mils	Epoxy on Aluminum
C	2 - 150 mils	± 0.04 mils	Polystyrene

Equipment Generic Name	Probe	Actual Equipment Specification		Manufacturer/Model #'s Applicable
		Range	Accuracy	
Certified Thickness Standard	B	2 – 20 mils	± 0.01 mils	DeFelsko, CAL-A4
Certified Thickness Standard	C	15-125 mils	± (0.1 mil +0.05% of thickness)	DeFelsko, CAL-P6

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:

- Damaged LCD display
- probe wear
- cracked or broken case
- missing parts
- proper identification

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

3.2 Gage Reset

3.2.1 Hold the “+” button of the gage until it powers up and performs a Reset.

3.3 Probe Zero

3.3.1 Select “Zero” from the main menu. Be sure the probe tip is clean and hit the menu/middle button to zero.

4 B Probe Calibration Process

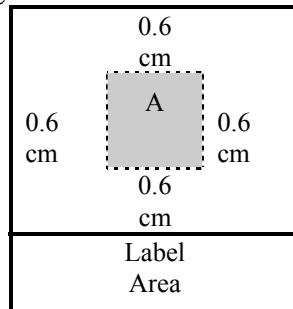
Note: Whenever the test requirement is not met, verify the results of each test and take corrective action before proceeding.

- 4.1 If the gage is to be calibrated in metric units, select the “Setup” menu, then “units” to change to microns.
- 4.2 Make a test measurement of the 10 mil (250 micron) standard. Be sure to use couplant in making measurements.
- 4.3 Using the “Cal Settings” menu, select “Adj Thickness” and use the “+” and “-” buttons to adjust the thickness reading shown on the gage to the value given for the thickness calibration standards. When desired thickness is attained press the menu/middle button to enter.
- 4.4 Use the UUC to make readings of the 2, 5, 10 and 20 mil (50, 125, 250 & 500 micron) reference standards. Verify that the readings are within the allowable limits determined in Table 6-1. Record the reference standard values and the readings on the Certificate of Calibration.

Note: the reference standards must be of the same coating material to ensure their sound velocities are the same.

- 4.5 When making readings the probe tip should be centered on point A of the Coating Thickness Reference Standard as shown in Figure 4-1.

Figure 4-1 Measurement Area



5 C Probe Calibration Process

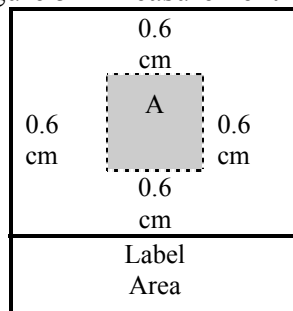
Note: Whenever the test requirement is not met, verify the results of each test and take corrective action before proceeding.

- 5.1 If the gage is to be calibrated in metric units, select the “Setup” menu, then “units” to change to microns.
- 5.2 Make a test measurement of the 100 mil (2500 micron) standard. Be sure to use couplant in making measurements.
- 5.3 Using the “Cal Settings” menu, select “Adj Thickness” and use the “+” and “-” buttons to adjust the thickness reading shown on the gage to the value given for the thickness calibration standards. When desired thickness is attained press the menu/middle button to enter.
- 5.4 Use the UUC to make readings of the 15, 60, 100 and 125 mil (375, 1500, 2500 & 3000 micron) reference standards. Verify that the readings are within the allowable limits determined in Table 6-1. Record the reference standard values and the readings on the Certificate of Calibration.

Note: the reference standards must be of the same material to ensure their sound velocities are the same.

- 5.5 When making readings the probe tip should be centered on point A of the Coating Thickness Reference Standard as shown in Figure 5-1.

Figure 5-1 Measurement Area



6 Performance Requirements

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

Table 6-1 Performance Requirements and Calibration Data for PosiTector 200

Thickness on UUC Label (mils)	Min. Reading Allowed ^❶ (mils)	Max. Reading Allowed ^❷ (mils)	Actual Measurement (mils)
A			B

❶ Calculation: $(A \times 0.97) - 0.1$. Round up to the nearest 0.1 mil.

❷ Calculation: $(A \times 1.03) + 0.1$. Round down to the nearest 0.1 mil.

* For metric readings convert using 1 mil = 25.4 microns

