



Management Procedure 2591
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Calibration Procedure

DeFelsko Corporation

PosiTector 200B, 200C & 200D

Coating Thickness Gages

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1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of the PosiTector 200B, 200C & 200D Coating Thickness Gages. The gage-probe combination has the following specifications:

Table 1-1 Measurement Ranges

Gage-Probe	Measurement Range *
200B	13 – 1000 microns (0.5 – 40 mils)
200C	50 – 3800 microns (2 – 150 mils)
200D	50 – 7600 microns (2 - 300 mils)

* Range limits apply to polymer coatings only.

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

2 Measurement Standards and Support Equipment Performance Requirements

2.1 The UUC accuracy requirements are based upon the published UUC performance specifications.

2.2 The test uncertainty ratio applied in this Calibration Procedure is 4:1 unless otherwise stated.

2.3 Minimum-Use-Specifications are the minimum test equipment specifications required to meet all the UUC accuracy requirements and the test uncertainty ratio applied.

Table 2-1 UUC Accuracy Requirements and Description

UUC	Performance Specifications		Test Method
200B	13 – 1000 microns (0.5 – 40 mils)	± (2 microns + 3% of reading) ± (0.1 mils + 3% of reading) ± (20 microns + 3% of reading) ± (1 mil + 3% of reading)	Compared to Reference Standards
200C	50 – 3800 microns (2 – 150 mils)		
200D	50 – 7600 microns (2 - 300 mils)		

Table 2-2 Minimum Use Specifications

UUC	Range	Accuracy
200B	13 – 1000 microns (0.5 – 40 mils)	± 0.59 microns (± 0.03 mils)
200C	50 – 3800 microns (2 – 150 mils)	± 0.87 microns (± 0.04 mils)
200D	50 – 7600 microns (2 - 300 mils)	± 5.37 microns (± 0.26 mils)

Table 2-3 Actual Equipment Specifications

Equipment Name	Range	Accuracy	Mfr / Model #'s Applicable
200B	75 - 500 microns (3 – 20 mils)	± 0.43 microns (± 0.017 mils)	DeFelsko Corp., STD-A3
200C	375 – 3000 microns (15 – 125 mils)	±(2.5 microns + 0.05% of thickness) ±(0.1 mils + 0.05% of thickness)	DeFelsko Corp., STD-P6
200D	375 – 6500 microns (15 - 250 mils)	±(2.5 microns + 0.05% of thickness) ±(0.1 mils + 0.05% of thickness)	DeFelsko Corp., STD-P1

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 2-4 Calibration Environmental and Warm-up Requirements

Measurement Standards & Support Equipment Environmental Requirements:	Temperature: 23 ± 5° C. Relative Humidity: Less than 95%
Measurement Standards & Support Equipment Warm-up and Stabilization Requirements:	Not Required

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 shall be repaired prior to beginning the calibration process.

3.2 Gage Reset

3.2.1 For bodies with serial numbers after 700000; when the unit is powered down, simultaneously hold the “+” and middle buttons until the reset symbol (2 arrows) appears. All other bodies press and hold the “+” button.

3.3 Probe Zero

3.3.1 Select “ZERO” from the gage menu. Be sure the probe tip is clean, then press the “+” button to zero.

4 B Probe Calibration Process

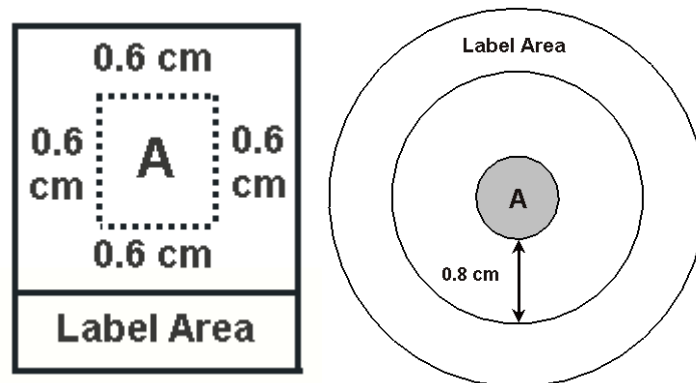
Note: Whenever the test requirement is not met, verify the results of each test and take corrective action before proceeding.

- 4.1 Apply couplant to the surface of the standards to be measured.
- 4.2 Take a reading of the 250 micron (10 mil) standard.
- 4.3 If the reading is not within the allowable limits determined in table 7-1, adjust the thickness reading shown on the gage to the value on the reference standard label.
 - 4.3.1 Use the middle button to select the “Cal Settings” menu item then the “Thickness” menu item.
 - 4.3.2 Use the “+” and “-“ buttons to set the desired value then select “OK”.
- 4.4 Use the UUC to take readings of all the reference standards. Verify that the readings are within the allowable limits determined in Table 7-1. 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 In taking readings the probe tip shall be centered on point A of the Coating Thickness Reference Standard as shown in Figure 4-1.

Figure 4-1 Measurement Area for Square or Round Reference Standards



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 Apply couplant to the surface of the standards to be measured.
- 5.2 Make a measurement on the 2500 micron (100 mil) standard.
- 5.3 If the readings are not within the allowable limits determined in table 7-1, adjust the thickness reading shown on the gage to the value on the reference standard label.
 - 5.3.1 Use the middle button to select the “Cal Settings” menu item then the “Thickness” menu item.
 - 5.3.2 Use the “+” and “-“ buttons to set the desired value then select “OK”.
- 5.4 Because the default upper gate is 3048um, the upper gate should be adjusted upwards to ensure accurate readings prior to measuring the 3000 um standard.
 - 5.4.1 Select “Cal Settings” from the gage menu and then select “Set Range”.
 - 5.4.2 Use the down portion of the middle button to highlight the “Hi” item and then press the “+“ button until the value is more than 3100 microns.
 - 5.4.3 Use the up portion of the middle button to highlight the “X” item and press the middle button to return to the measurement screen.
- 5.5 Use the UUC to take readings of all the reference standards. Verify that the readings are within the allowable limits determined in Table 7-1. 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.
- 5.6 In taking readings the probe tip shall be centered on point A of the Coating Thickness Reference Standard as shown in Figure 4-1.

6 D Probe Calibration Process

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

- 6.1 Apply couplant to the surface of the standards to be measured.
- 6.2 Make a measurement on the 4500 micron (185 mil) standard.
- 6.3 If the readings are not within the allowable limits determined in table 6-1, adjust the thickness reading shown on the gage to the value on the reference standard label.
 - 6.3.1 Use the middle button to select the “Cal Settings” menu item then the “Thickness” menu item.
 - 6.3.2 Use the “+” and “-“ buttons to set the desired value then select “OK”.
- 6.4 Use the UUC to take readings of all the reference standards. Verify that the readings are within the allowable limits determined in Table 7-1. 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.

- 6.5 In taking readings the probe tip shall be centered on point A of the Coating Thickness Reference Standard as shown in Figure 4-1.

7 Performance Requirements

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

Table 7-1 Performance Requirements and Calibration Data
for PosiTector 200B, 200C & 200D

Thickness on Standard Label (microns)	Min. Reading Allowed ^❶ (microns)	Max. Reading Allowed ^❷ (microns)	Gage Measurement (microns)
A			B

❶ Calculation for 200B & 200C: $(A \text{ times } 0.97) - 2$. Round up to the nearest micron.

❶ Calculation for 200D: $(A \text{ times } 0.97) - 20$.

❷ Calculation for 200B & 200C: $(A \text{ times } 1.03) + 2$. Round down to the nearest micron.

❷ Calculation for 200D: $(A \text{ times } 1.03) + 20$.

* For imperial/metric readings convert using $1 \text{ mil} = 25.4 \text{ microns}$

Management Procedure Change Notice

Procedure Number: MP 2591
 Revision Level: E
 Date of Change: June 4, 2014
 Title: Calibration Procedure for PosiTector 200B, 200C and 200D

Reason for Change: <ul style="list-style-type: none"> • Update 200D probe tolerance to add 3% of reading • Gate adjustment not required on 200D product
Description of Change: <ul style="list-style-type: none"> • Added +3% of reading to 200D in table 2-1 • In table 2-2 updated 200D minimum use specification accuracy to 5.37 microns and 0.26 mils • Removed section 6.4 • In table 7-1 added A times 0.97 and A times 1.03 to notes 1 & 2 respectively.

I confirm I have read and understand the procedure and the change described above.

Printed Name	Signature	Date

Management Form 0010.02-05/1998