

Calibration Procedure

DeFelsko Corporation

PosiTector 6000 F0S PosiTector 6000 F45S PosiTector 6000 F90S

Coating Thickness Probes

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1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of DeFelsko Corporation PosiTector 6000 F0S, F45S & F90S probes with the following specifications:

Table 1-1 Measurement Ranges

Probe	Measurement Range
6000 F0S 6000 F45S 6000 F90S	0-1000 microns (0-40 mils)

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. For values less than or equal to 100 microns (4 mils) the minimum test uncertainty ratio is 2.9:1

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

2.4 The force applied to the UUC during the measurement process is between 60 and 70 grams.

Table 2-1 UUC Accuracy Requirements and Description

UUC	Performance Specifications		Test Method
6000 F0S 6000 F45S 6000 F90S	0 - 100 microns (0 - 4 mils) > 100 microns (> 4 mils)	$\pm (0.5 \text{ microns} + 1\% \text{ of reading})$ $\pm (0.02 \text{ mils} + 1\% \text{ of reading})$ $\pm (2.0 \text{ microns} + 3\% \text{ of reading})$ $\pm (0.1 \text{ mils} + 3\% \text{ of reading})$	Compared to Reference Standards

Table 2-2 Minimum Use Specification

Range	Accuracy
0 - 100 microns (0 - 4 mils)	$\pm 0.125 \text{ microns}$ ($\pm 0.005 \text{ mils}$)
>100 microns (>4 mils)	$\pm 1.25 \text{ microns}$ ($\pm 0.055 \text{ mils}$)

Table 2-3 Actual Equipment Specification

Equipment Generic Name	Range	Accuracy	Manufacturer/Model Numbers Applicable
Coating Thickness Reference Standards	75 - 1000 microns (3 - 40 mils)	± 0.43 microns (± 0.017 mils)	DeFelsko Corporation, STD-S2

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 readout
- probe wear or coating
- cracked or broken case
- missing probe cover, battery door, or other 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.

Caution: Be sure to keep the probe well away from any metal surface during the RESET process.

3.2.2 For F90 probes only, attach the alignment aid.



3.2.3 Measure the uncoated reference standard. If the probe reads more than ± 4 μm , reject the probe for characterization.

3.3 Probe Zero

3.3.1 Select the Main Menu ZERO function and measure the uncoated Reference Standard. One measurement is sufficient.

3.3.2 Perform a zero check by measuring the same standard. If the gage does not read zero, adjust the value to zero using the “+” and “-“ buttons.

4 Calibration Process

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

4.1 Review the Performance Requirements Table 5-1.

Note: The probe calibration may be verified in either normal or high-resolution mode. Accuracy is the same for both modes.

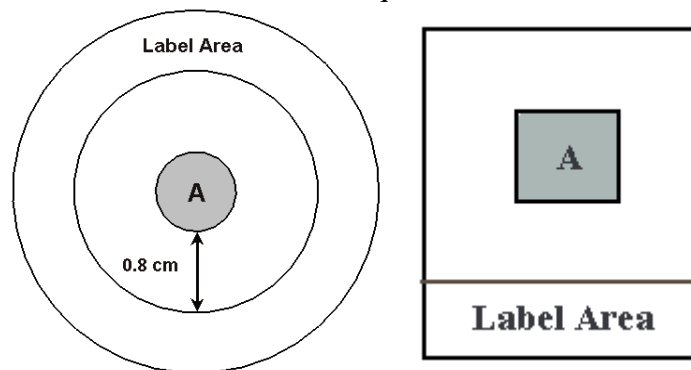
4.2 Using the appropriate Certificate of Calibration template for the UUC, record the thickness from the Reference Standard labels.

- 4.3 Determine the allowed range of readings for the UUC using the calculation methods shown in Table 5-1.
- 4.4 Use the UUC to take readings of the applicable reference standard. Verify that the readings are within the allowable limits determined in section 4.3. Record the readings on the Certificate of Calibration.

Note: Record all digits displayed on the LCD. This may vary depending on the resolution mode.

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

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



5 Performance Requirements

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

Table 5-1 Performance Requirements and Calibration Data for PosiTector 6000 F0S, F45S & F90S

Thickness on Reference Standard Label (microns)	Min. Reading Allowed ^❶ (microns)	Max. Reading Allowed ^❷ (microns)	Actual Probe Measurement (microns)
A			B
0	- 0.5	+ 0.5	

❶ Calculation 0-100 microns: $(A \text{ times } 0.99) - 0.5$. Round up to nearest micron.
 >100 microns: $(A \text{ times } 0.97) - 2$. Round up to nearest micron.

❷ Calculation 0-100 microns: $(A \text{ times } 1.01) + 0.5$. Round down to nearest micron.
 >100 microns: $(A \text{ times } 1.03) + 2$. Round down to nearest micron.

*For imperial/metric readings convert using 1 mil = 25.4 microns