

Calibration Procedure

DeFelsko Corporation

PosiTector 6000 FN
PosiTector 6000 FNS
PosiTector 6000 FNRS

Coating Thickness Gages

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1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of DeFelsko Corporation PosiTector 6000 FN, 6000 FNS and 6000 FNRS probes and gages. All gages have the following ranges:

Table 1-1 Measurement Ranges

Gage	Measurement Range
6000 FN 6000 FNS 6000 FNRS	0-1500 microns (0-60 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.

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.

Table 2-1 UUC Accuracy Requirements and Description

UUC	Performance Specifications		Test Method
6000 FN 6000 FNS 6000 FNRS	0 - 50 microns (0 - 2 mils) >50 microns (>2 mils)	± (1 microns + 1% of reading) ± (0.05 mils + 1% of reading) ± (2 microns + 1% of reading) ± (0.1 mils + 1% of reading)	Compared to Reference Standards

Table 2-2 Minimum Use Specification

Range	Accuracy
0 - 50 microns (0 - 2 mils)	± 0.25 microns (± 0.013 mils)
>50 - 1500 microns (>2 - 60 mils)	± 0.62 microns (± 0.035 mils)

Table 2-3 Actual Equipment Specification

Equipment Generic Name	Range	Accuracy	Manufacturer/Model #'s Applicable
Coating Thickness Reference Standards	75-1500 microns (3-60 mils)	± 0.43 microns (± 0.017 mils)	DeFelsko Corporation, STD-A1 & STD-S1

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: $23 \pm 5^\circ \text{C}$. 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 gages with serial numbers after 700000; when the gage is powered down, simultaneously hold the “+” and middle buttons of the gage until the Reset symbol (2 arrows) appears. All other gages 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 Measure the ferrous uncoated Reference Standard. If the gage reads more than +/- 4 um reject the gage for recharacterization. This step does not need to be repeated with the non-ferrous uncoated Reference Standard.

3.3 Probe Zero

Note: The FN type probes uses separate ferrous and non-ferrous zero settings. The zero check needs to be done prior to calibrating each portion of the system. Use separate uncoated substrates for the two zero points. Adjustments are made to the currently displayed substrate only.

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 within tolerance, repeat the Main Menu ZERO function.

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: PosiTector 6000 gages with serial numbers greater than 40000 have a high-resolution mode. The gage 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.

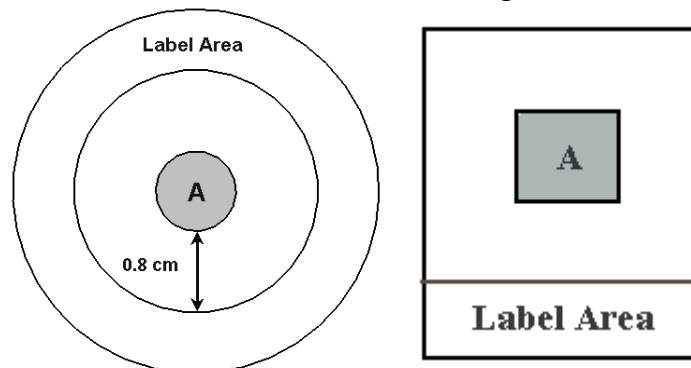
4.3 Determine the allowed range of readings for the UUC using the calculation methods shown in Table 5-1.

4.4 Use the UUC to take readings of all the reference standards. Verify that the readings are within the allowable limits determined in 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 Round or Square Reference Standards



5 Performance Requirements

Note: The technician shall 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 FN, FNS & FNRS

Thickness on Standard Label (microns)	Min. Reading Allowed ^① (microns)	Max. Reading Allowed ^② (microns)	Gage Measurement (microns)
A			B
Ferrous Standards			
0	-1	+1	
Non-Ferrous Standards			
0	-1	+1	

- ① Calculation ≤ 50 microns: (A times 0.99) - 1. Round up to the nearest 1 micron.
 > 50 microns: (A times 0.99) - 2. Round up to the nearest 1 micron.
- ② Calculation ≤ 50 microns: (A times 1.01) + 1. Round down to the nearest 1 micron.
 > 50 microns: (A times 1.01) + 2. Round down to the nearest 1 micron.
- * For imperial/metric readings convert using 1 mil = 25.4 microns