



Management Procedure 2537
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Calibration Procedure

DeFelsko Corporation

DeFelsko/PosiTector 6000 N0S
DeFelsko/PosiTector 6000 N45S
DeFelsko/PosiTector 6000 N90S

Coating Thickness Gages

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1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of DeFelsko Coating Thickness Gages, DeFelsko/PosiTector 6000 with micro probes N0S, N45S or N90S. All gage probe combinations have the same specifications and ranges:

Table 1-1 Measurement Ranges

Gage	Measurement Range
6000 N0S, N45S & N90S	0-625 μm and 0-25 mils

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

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

2 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	Test Method
1.1	Accuracy Test 6000 N0S 6000 N45S 6000 N90S	0 to 100 μm , $\pm (0.50 \mu\text{m} + 1\% \text{ of reading})$ > 100 μm , $\pm (2 \mu\text{m} + 3\% \text{ of reading})$ 0 to 4 mils, $\pm (0.01 \text{ mils} + 1\% \text{ of reading})$ > 4 mils, $\pm (0.1 \text{ mils} + 3\% \text{ of reading})$	Compared to Coating Thickness 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 ratios applied in this Calibration Procedure are 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.

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	0-500 μm	$\pm 0.25 \mu\text{m}$	DeFelsko Corporation, Thickness Calibration Standards, Model CAL-A2
	0-20 mils	$\pm 0.01 \text{ mils}$	

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 should be repaired prior to beginning the calibration process.

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 For best repeatability, place probe into a mechanical probe fixture. Perform the Main Menu Reset function. After reset perform the Main Menu Zero function (one zero is sufficient) on an uncoated reference standard. Perform a zero check on the same standard. If the gage does not read zero, repeat the Main Menu Zero function .

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

4.2 Accuracy Test

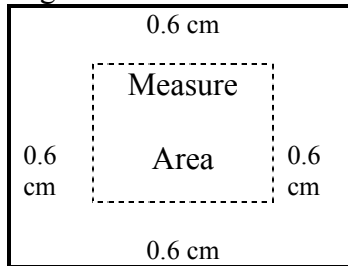
Note: DeFelsko/PosiTector 6000 gages with serial numbers greater than 40000 have a high-resolution mode. The gage may be calibrated in either normal or high-resolution mode. Accuracy is the same for both modes.

- 4.2.1 Review the Performance Requirements Table 5-1.
- 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.
- 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.

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

- 4.2.5 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.

Figure 4-1 Measurement Area



5 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 5-1 Performance Requirements and Calibration Data for DeFelsko/PosiTector 6000 N0S, N45S & N90S

Nominal Thickness	Reference Standard	UUC Indication or Reading *		
		Gage Measurement	Min. Reading Allowed	Max. Reading Allowed
A	B	C	D	E
0 mils	uncoated		minus 0.01 mils	plus 0.01 mils
3 mils			0.99 times B minus 0.01 mils	1.01 times B plus 0.01 mils
10 mils			0.97 times B minus 0.1 mils	1.03 times B plus 0.1 mils
20 mils				

* For metric readings convert using 1 mil = 25.4 microns