



Management Procedure 2538  
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## Calibration Procedure

DeFelsko Corporation

DeFelsko/PosiTector 6000 FN  
DeFelsko/PosiTector 6000 FNS  
DeFelsko/PosiTector 6000 FNRS

Coating Thickness Gages

# 1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of DeFelsko Coating Thickness Gages, DeFelsko/PosiTector 6000 FN, 6000 FNS and 6000 FNRS. Both gages have the same specifications and ranges:

Table 1-1 Measurement Ranges

Gage	Measurement Range
6000 FN	0-1500 $\mu\text{m}$ and
6000 FNS	0-60 mils
6000 FNRS	

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

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

1.4 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 FN 6000 FNS 6000 FNRS	0 to 50 $\mu\text{m}$ , $\pm$ (1 microns + 1% of reading) > 50 $\mu\text{m}$ , $\pm$ (2 microns + 1% of reading)  0 to 2 mils, $\pm$ (0.05 mils + 1% of reading) > 2 mils, $\pm$ (0.1 mils + 1% 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      Temperature:  $23 \pm 5^\circ \text{C}$ .  
 Environmental Requirements:                              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	0-1500 $\mu\text{m}$	$\pm 0.25 \mu\text{m}$	DeFelsko Corporation, Thickness Calibration Standards, Models CAL-A1 and CAL-S1
	0-60 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 Perform the Main Menu Reset function. After reset perform the Zero check and adjust the zero against an uncoated reference standard as required.

**Note:** The FN type probe uses separate ferrous and non-ferrous zero settings. The Zero Check should 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.

**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. Verify the mode in which the customer wants the gage calibrated prior to beginning the actual calibration.

4.2.1 Review the Performance Requirements Table 5-1.

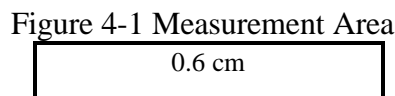
4.2.2 Using the appropriate Certificate of Calibration template for the UUC, record the reference material values on the form.

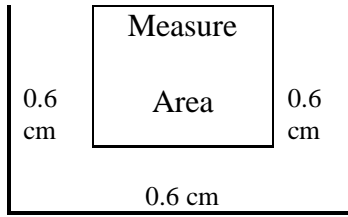
4.2.3 Determine the allowed range of readings using the calculation methods shown in columns D and E of Table 5-1.

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.





## 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 FN, FNS & FNRS

		UUC Indication or Reading *		
Nominal Thickness	Reference Standard	Gage Measurement	Min. Reading Allowed	Max. Reading Allowed
A	B	C	D	E
<b>Ferrous Standards</b>				
0 mils	Uncoated	0 mils	minus 0.05 mils	plus 0.05 mils
3 mils			0.99 times B minus 0.1 mils	1.01 times B plus 0.1 mils
10 mils				
60 mils				
<b>Non-Ferrous Standards</b>				
0 mils	Uncoated	0 mils	minus 0.05 mils	plus 0.05 mils
3 mils			0.99 times B minus 0.1 mils	1.01 times B plus 0.1 mils
10 mils				
60 mils				

\* For metric readings convert using 1 mil = 25.4 microns