



Management Procedure 2533
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Calibration Procedure

DeFelsko Corporation

DeFelsko/PosiTector 6000 FT
DeFelsko/PosiTector 6000 FTS
DeFelsko/PosiTector 6000 NTS
DeFelsko/PosiTector 6000 FNTS

Coating Thickness Gage

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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 FT, FTS, NTS, and FNTS with the following specifications:

Table 1-1 Measurement Ranges

| Gage | Measurement Range |
|-----------|-------------------|
| 6000 FT | 0-6 mm and |
| 6000 FTS | 0-250 mils |
| 6000 NTS | |
| 6000 FNTS | |

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 | 0 to 2.5 mm, $\pm (0.01 \text{ mm} + 1\% \text{ of reading})$ | Compared to Coating Thickness Reference Standards. |
| | 6000 FT | $> 2.5 \text{ mm}, \pm (0.01 \text{ mm} + 3\% \text{ of reading})$ | |
| | 6000 FTS | | |
| | 6000 NTS | 0 to 100 mils, $\pm (0.5 \text{ mils} + 1\% \text{ of reading})$ | |
| | 6000 FNTS | $> 100 \text{ mils}, \pm (0.5 \text{ mils} + 3\% \text{ of reading})$ | |

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 | 0-6 mm | $\pm 4.0 \mu\text{m}$ | DeFelsko Corporation, Thickness Calibration Standards, Model CAL-P1 |
| | 0-250 mils | $\pm 0.16 \text{ mil}$ | |

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 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

4.2.1 Review the Performance Requirements Table 5-1.

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.

4.2.2 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.

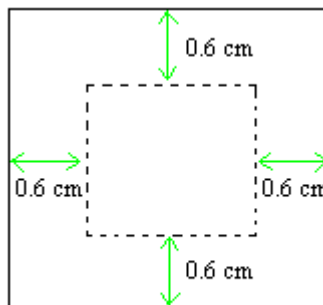
4.2.4 Place the Thickness Reference Standard on an uncoated steel zero reference plate to make measurements.

4.2.5 Use the UUC to make readings of each 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.

4.2.6 In making readings the probe tip should be centered on point A of the Coating Thickness Reference 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 FT, FTS, NTS & FNTS

| 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 0.5 mils | plus 0.5 mils |
| 15 mils | | | 0.99 times B minus 0.5 mils | 1.01 times B plus 0.5 mils |
| 80 mils | | | | |
| 185 mils | | | 0.97 times B minus 0.5 mils | 1.03 times B plus 0.5 mils |
| 250 mils | | | | |

* For metric readings convert using 1 mil = 25.4 microns