DeFelsko®

Management Procedure 2502
Revision: B
Date Issued: October 21, 1998
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Calibration Procedure

DeFelsko Corporation

PosiTest G
PosiTest GM
PosiTest F
PosiTest FM

Coating Thickness Gages

Table of Contents

1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of DeFelsko Corporation Coating Thickness Gages, PosiTest G, GM, F, and FM. These gages have the following ranges:

Table 1-1 Measurement Ranges

Gage	Measurement Range
PosiTest G	0 - 200 microns
PosiTest GM	0 - 8 mils
PosiTest F	0 - 2000 microns
PosiTest FM	0 - 80 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 uncertainty ratio applied in this Calibration Procedure is 4:1 unless otherwise stated. For the PosiTest G & GM models the minimum test uncertainty ratio is 2.3:1 for readings below 35 microns.

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

Note: For products with different accuracy requirements over their measurement range only the most stringent Minimum-Use-Specification is listed.

Table 2-1 UUC Accuracy Requirements and Description

UUC	Performance Specifications		Test Method
PosiTest G	0 – 20 microns	± 1 microns	Compared to Reference Standards
	> 20 microns	± 5% of reading	
PosiTest GM	0 – 0.8 mils	± 0.04 mils	
	> 0.8 mils	± 5% of reading	
PosiTest F	0 – 100 microns	± 5 microns	
	> 100 microns	± 5% of reading	
PosiTest FM	0 – 4 mils	± 0.2 mils	
	> 4 mils	± 5% of reading	

Table 2-2 Minimum Use Specification

Product	Range	Accuracy
G	0 – 20 microns	± 0.25 microns
GM	0 – 0.8 mils	± 0.01 mils
F	0 – 100 microns	± 1.25 microns
FM	0 – 4 mils	± 0.05 Mils

Table 2-3 Actual Equipment Specification

Equipment Generic Name	Range	Accuracy	Manufacturer/Model #'s Applicable
PosiTest G & GM	15-100 microns (0.6 – 4 mils)	± 0.43 microns (± 0.017 mils)	DeFelsko Corporation, STD-S3
PosiTest F & FM	75 - 1500 microns (3 - 60 mils)	± 0.43 microns (± 0.017 mils)	DeFelsko Corporation, STD-S1

Caution: The instructions in this Calibration Procedure relate specifically to the equipment and conditions listed in this section. 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:

- Unreadable or damaged dial face
- Damaged movement
- Probe wear, pitting or coating
- Worn feet
- Cracked case
- Proper identification

3.1.2 Damage or excess wear shall be repaired prior to beginning the calibration process.

3.2 Verifying Probe Balance

3.2.1 Turn the dial wheel fully counterclockwise (full scale) to the stop.

3.2.2 Invert the gage and observe that the probe tip floats freely. Rotate the gage sideways and vertically to ensure the probe tip floats freely in these positions as well. If the probe tip does not float freely, the gage will not operate accurately and must be repaired.

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

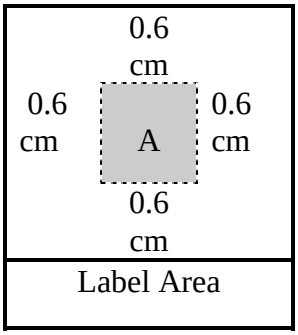
4.2 Using the appropriate Certificate of Calibration template for the UUC, record the thickness from the Reference Standard label.

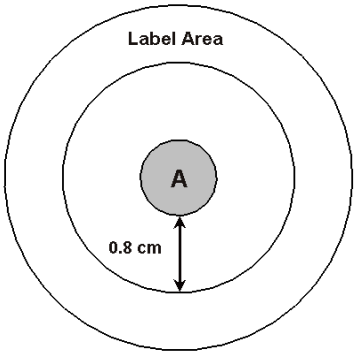
4.3 Determine the allowed range of readings using the calculation methods shown in columns A and B of Table 5-1 for the UUC

4.4 Use the UUC to take readings of the applicable reference standard. Verify that the readings are within the allowable limits determined in 4.3. Record the Reference Standard values and the readings on the Certificate of Calibration.

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

Fig. 4-1 Measurement Area for Square and round Reference Standards





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 5-1A Performance Requirements and Calibration Data for PosiTest G

Nominal Reference Thickness	Thickness on Standard Label	Min. Reading Allowed❶	Max. Reading Allowed❷	Gage Measurement
	A			B
Uncoated	0	-1.0 microns	+1.0 microns	
15 microns				
40 microns				
100 microns				

❶Calculation ≤ 20 microns: (A - 1)
> 20 microns: (A * 0.95) round up to the nearest 1 micron

❷Calculation ≤ 20 microns: (A + 1)
> 20 microns: (A * 1.05) round down to the nearest 1 micron

Table 5-1B Performance Requirements and Calibration Data for PosiTest GM

Nominal Reference Thickness	Thickness on Standard Label	Min. Reading Allowed❶	Max. Reading Allowed❷	Gage Measurement
	A			B
Uncoated	0	-0.04 mils	+0.04 mils	
0.6 mils				
1.6 mils				
4.0 mils				

❶Calculation ≤0.8 mils: (A - 0.04)
>0.8 mils: (A * 0.95) round up to the nearest 0.1 mils

❷Calculation ≤0.8 mils: (A + 0.04).
>0.8 mils: (A * 1.05) round down to the nearest 0.1 mils

Table 5-1C Performance Requirements and Calibration Data for PosiTest F

Nominal Reference Thickness	Thickness on Standard Label	Min. Reading Allowed❶	Max. Reading Allowed❷	Gage Measurement
	A			B
Uncoated	0	-5.0 microns	+5.0 microns	
75 microns				
250 microns				
1500 microns				

❶Calculation ≤ 100 microns: (A - 5)
> 100 microns: (A * 0.95) round up to the nearest 1 micron

❷Calculation ≤ 100 microns: (A + 5)
> 100 microns: (A * 1.05) round down to the nearest 1 micron

Table 5-1D Performance Requirements and Calibration Data for PosiTest FM

Nominal Reference Thickness	Thickness on Standard Label	Min. Reading Allowed❶	Max. Reading Allowed❷	Gage Measurement
	A			B
Uncoated	0	-0.2 mils	+0.2 mils	
3 mils				
10 mils				
60 mils				

❶Calculation ≤0.8 mils: (A - 0.2)
>0.8 mils: (A * 0.95) round up to the nearest 0.1 mils

❷Calculation ≤0.8 mils: (A + 0.2).
>0.8 mils: (A * 1.05) round down to the nearest 0.1 mils

Management Procedure Change Notice

Procedure Number: MP 2502
Revision Level: B
Date of Change: February 17, 2012
Title: Calibration Procedure for PosiTest F, FM G & GM

Reason for Change: New Reference Standards added
Description of Change: General formatting changes Created table 2-4 Added round target to 4-1 Revised definitions in 2.1 and 2.3 Added tables for each product in 5-1

I confirm I have read and understand the procedure and the change described above.

Printed Name	Signature	Date

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