



Management Procedure 2585  
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## Calibration Procedure

DeFelsko Corporation

# PosiTector UTG, UTG-STD & UTG-ME

Ultrasonic Thickness Gage

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# 1 Introduction and UUC Performance Requirements

1.1 This procedure describes the calibration of the PosiTector UTG Ultrasonic Thickness Gage. Specifications for the gage-probe combination are shown in Table 1-1.

Table 1-1 Measurement Ranges

Gage-Probe	Measurement Range *	Velocity Range
UTG with dual element transducer	0.040" to 5.000" 1 to 125 mm	0.0492 to .3930 in/ $\mu$ s 1250 to 10,000 m/s
UTG with single element contact transducer	0.100" to 5.000" 2.5 to 125 mm	

\* The actual measurement range of the system depends on the material being measured. Ranges shown are based on carbon steel.

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

Table 1-2 UUC Calibration Requirements and Description

(UUC) Function	Performance Specifications	Test Method
Wall Thickness	$\pm 0.001$ " ( $\pm 0.03$ mm)	Compare to Step Blocks

# 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 ratio applied in this Calibration Procedure is 4:1 or better.

Table 2-1 Calibration Environmental and Warm Up Requirements

Measurement Standards & Support Equipment Environmental Requirements:	Temperature: $23 \pm 5^\circ$ C. Relative Humidity: Less than 95%
Measurement Standards & Support Equipment Warm-up and Stabilization Requirements:	None

Table 2-2 Measurement Standards & Support Equipment Performance Requirements

Minimum-Use-Specification	
Range	Accuracy
0.040 to 5.000”	± 0.00025”
1 to 125 mm	± 0.006 mm

Equipment Generic Name	Actual Equipment Specifications		Manufacturer & Model Applicable
	Range	Accuracy	
Step Blocks	0.100 to 0.500” 2.50 to 12.50 mm	± 0.00020” ± 0.005 mm	PHTool Custom 5 Step Block

**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.

### 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 display
- probe wear
- 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

Note: Please refer to UUC instruction manual for menu navigation instructions, details on features and operating instructions (i.e. required amount of couplant and pressure).

##### 3.2.1 With the UUC powered off, select the “hard” reset feature by holding the “+” button until the Reset symbol (2 arrows) appears.

##### 3.2.2 After reset, select the Main Menu Zero function and measure the zero plate attached to the probe. After zeroing, verify the probe on the 2.5 mm (0.100”) and 12.5 mm (0.500”) steps of the 5-step block. Allowable tolerances following zeroing are ± 0.05 mm (0.002”).

## 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 Select the 2-Pt Adjust feature from the Cal Adjust section of the menu. Perform a two-point calibration using the 2.5 mm (0.100”) and 12.5 mm (0.500”) steps of the 5-step block. This will adjust the sound velocity of the gage and the zero reference to the material of the step block.
- 4.3 Using the appropriate Certificate of Calibration template for the UUC, record the thickness from the Reference Standard label.
- 4.4 Determine the allowed range of readings using the calculation methods shown in column A of table 5-1.
- 4.5 Use the UUC to take measurements on each step of the 5-step block. Verify that the readings are within the allowable limits and record the readings on the Certificate of Calibration.

## 5 Performance Requirements

**Note:** The technician will collect the data needed to complete column B of Table 5-1. Do not write in this procedure.

Table 5-1 Performance Requirements and Calibration Data for PosiTector UTG

Reference Thickness (mm)	Min. Reading Allowed <sup>❶</sup> (mm)	Max. Reading Allowed <sup>❷</sup> (mm)	Actual Gage Measurement (mm)
A			B

For imperial/metric readings convert using 1” = 25.4 mm

❶ Calculation: A - 0.03 mm

❷ Calculation: A + 0.03 mm

