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Calibration Procedure

Phase II, Inc.

UTG-2000/2020

Ultrasonic Thickness Gauge

1 Introduction and GBC Performance Requirements

- 1.1 This procedure describes the calibration of the Phase II UTG-2000 and UTG-2020 Ultrasonic thickness Gages. Specifications for the gage-probe combination are shown in Table 1-1.

Table 1-1 Measurement Ranges

Gauge-Probe	Measurement Range*	Velocity Range
UTG-2000	0.040" to 5.000"	0.0492 to .3930 in/μs
w/5MHz probe	1 to 125mm	1250 to 10,000 m/s

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

- 1.2 The unit being calibrated will be referred to as the **GBC** (gauge being calibrated)
- 1.3 GBC Environmental Range:
- Temperature: 23 +/- 5° C
 - Relative Humidity: Up to 95%
- 1.4 GBC Warm Up And Stabilization Period Requirements:
- Not Required
- 1.5 GBC Calibration Specification And Requirements:
- See Table 1-2

Table 1-2 GBC Calibration Specification And Requirements (GBC) Accuracy Performance Specifications Test Method

UTG-2000	+/- 0.001"	Step Block Comparison
w/5MHz Probe	+/- 0.02mm	

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 GBC and the capabilities required of the measurement standards system.
- 2.3 The uncertainty ratio applied in this calibration procedure is 4:1 or better
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 must be interpreted accordingly.
- 2.4 Measurement Standards Equipment Environmental Requirements
- Temperature: 23 +/- 5° C
 - Relative Humidity: Up to 95%
- 2.5 Measurement Standards Equipment Warm Up And Stabilization Requirements:
- Standards and GBC to be maintained at the same temperature and relative humidity as the GBC prior to testing
- 2.6 Measurement Standards Equipment Performance Requirements
- Refer to Table 2-1

Table 2-1 Measurement Standards Equipment Performance Requirements
Equipment generic name Minimum Use Specifications MFG & Model Applicable

+	home
+	about us
+	services
+	outsourcing
+	tooling products
+	hardness testers
+	ultrasonic thickness gauges
+	surface roughness
+	coating thickness
+	force gauges
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5 Step Block

Range: 0.100 to 0.500"
2.50 to 12.50mm
Accuracy: +/- 0.00025"
+/- 0.005mm

UTG-0500
Phase II

3 Preliminary Operations

Note: Review the entire document before starting the calibration process.

3.1 Visual Inspection

Visually inspect the GBC for:

- Damaged LCD display
- Probe wear
- Cracked or broken case
- Missing parts
- Proper identification

Damage or excessive wear should be repaired prior to calibration.

4 Calibration Process

Please refer to the operation manual for instructions on menu navigation, details and features.

4.1 Gauge reset

- With the GBC powered on, go to "Default" in the menu. Select default by pressing the save button on the gage. This will bring the tester back to factory specs for Carbon steel including the sound velocity for carbon steel.

4.2 Calibration

- Place small amount of couplant gel on face of probe. Place the probe on the metallic test block on the front cover of the gage. The reading should display .157". This is the factory calibration setting.
- Proceed to take measurements on each of the 5 steps of the test block and document and verify readings per performance requirements in table 5-2
- Note:** Whenever the test requirement is not met, verify the results of each test and take corrective action before proceeding.

5 Performance requirements

Note: The technician should collect all data needed to complete column B of Table 5-1 and 5-2. Do not write in this procedure

Table 5-1 Expected sound velocity for UTG-2000

Nominal Sound velocity	GBC Indication or Reading*	
	Gauge Adjusted Sound velocity	Allowable Reading
A	B	C
.2330 in/ μ s		+/- .0030 in/ μ s

Table 5-2 Performance Requirements and Calibration Data For UTG-2000

GBC Indication or Reading*			
Reference Thickness	Reference Thickness	Gauge Measurement	Allowable Reading
A	A	B	C
2.50mm	0.100"		+/- 0.001" / 0.02mm
5.00mm	0.200"		+/- 0.001" / 0.02mm
7.50mm	0.300"		+/- 0.001" / 0.02mm
10.00mm	0.400"		+/- 0.001" / 0.02mm
12.50mm	0.500"		+/- 0.001" / 0.02mm

* For metric readings convert using 1" = 25.4mm

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