

# Thickness Gauge Calibration Check – Precision Measurement Verification

## 1.0 Maintenance Objective & Frequency

The objective of this procedure is to verify the accuracy of a thickness gauge (mechanical micrometer or ultrasonic thickness gauge) against certified reference standards. This ensures that material thickness measurements remain within tolerance for quality control and process consistency. Perform this calibration check monthly or whenever the gauge is dropped, exposed to extreme temperatures, or produces suspect readings.

## 2.0 Lockout/Tagout (LOTO) & Safety

- No machine energy isolation is required for a handheld gauge. Ensure the work area is clean, dry, and free of debris.
- Wear safety glasses and nitrile gloves when handling calibration standards and cleaning solvents.
- If the gauge is permanently mounted on a production line, isolate the line's electrical supply and apply a personal lockout tag before removing the gauge.

## 3.0 Required Tools, Parts & Lubricants

- Certified calibration standards (e.g., gauge blocks or certified thickness shims) covering the gauge's measurement range
- Lint-free wipes (Kimwipes or equivalent)
- Isopropyl alcohol (99%) in a spray bottle
- Small soft-bristle brush (for cleaning anvils or transducer face)
- Couplant gel (for ultrasonic gauges only)
- Calibration screwdriver (if gauge has a zero-adjust screw)
- Digital thermometer (to verify ambient temperature, if required by standard)

## 4.0 Step-by-Step Maintenance Procedure

1. Clean the gauge's measuring faces (anvils or transducer) and the calibration standards using isopropyl alcohol and a lint-free wipe. Allow to air dry completely.
2. For a mechanical micrometer: close the anvils gently (using the ratchet stop) and verify the zero reading. If not zero, use the calibration screwdriver to adjust the zero mark. For an ultrasonic gauge: apply a small drop of couplant to the transducer face and place it on the zero reference block (usually supplied with the gauge). Press the zero button and hold until the display reads zero.
3. Select a calibration standard that is approximately 25% of the gauge's full scale. For example, if the gauge range is 0–25 mm, use a 6 mm standard.
4. For a mechanical micrometer: place the standard between the anvils and gently tighten using the ratchet stop. Read the measurement. For an ultrasonic gauge: apply couplant to the standard, place the transducer on it, and read the measurement.

5. Record the reading. Calculate the error:  $\text{Error} = (\text{Measured Value} - \text{Standard Value})$ . The error must be within  $\pm 0.01$  mm (or as specified by your quality plan). If out of tolerance, proceed to step 6; otherwise skip to step 8.
6. If the gauge is out of tolerance, attempt a zero re-calibration (repeat step 2) and re-measure the same standard. If still out of tolerance, clean the anvils/transducer again and repeat the measurement.
7. If the gauge remains out of tolerance after cleaning and re-zeroing, tag the gauge as 'Out of Service – Requires Factory Calibration' and remove it from the production area. Issue a replacement gauge.
8. Repeat the measurement at 50% and 75% of full scale using appropriate standards. Record all readings and errors on the calibration log.
9. For ultrasonic gauges: verify the velocity calibration by measuring a known thickness standard made of the same material as the production parts. Adjust the velocity setting if necessary per the gauge manual.
10. After completing all measurements, clean the gauge and standards again with isopropyl alcohol. Store the standards in their protective case. Return the gauge to its designated storage location.

## 5.0 Verification & Return to Service

1. Perform a final verification by measuring a certified standard at the mid-range of the gauge. The reading must be within  $\pm 0.01$  mm (or your specified tolerance).
2. If the gauge passed all calibration checks, attach a calibration sticker with the date, technician initials, and next due date. Update the calibration log in ServiceGrid.
3. If the gauge was replaced, ensure the replacement gauge has a valid calibration sticker and is logged into the inventory system. Dispose of the failed gauge per company policy.
4. Sign off on the PM work order in ServiceGrid, attaching the calibration log as a note or file.

**Regulatory Disclaimer:** This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.