Sylvac Calibration Standard – SYL 801 – Calipers

This standard is based on ISO 13385-1

1. REFERENCE CONDITIONS

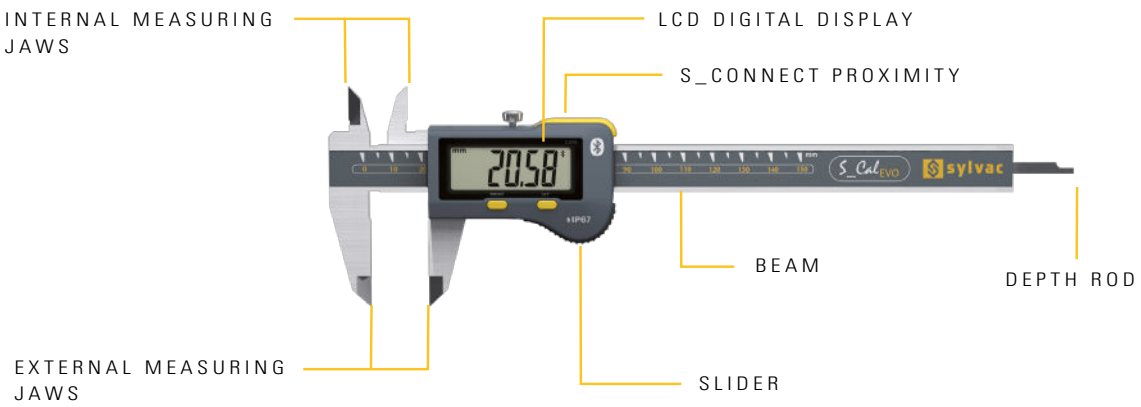
1.1. Measurement standards

- Set of gauge blocks lengths 5 to 300 mm.
- Set of gauge rings diameters 4 to 25 mm.
- Computer equipment with calibration software (Sycopro) and connection cable.

1.2. Ambient conditions for calibration

- The reference temperature is 20°C.
- The maximum variation in room temperature (Δ max) is 1°C over a period of 6 hours.

2. FUNCTIONAL DIAGRAM



3. VERIFICATIONS OF THE INSTRUMENT

3.1. Preparation and cleaning

- Check that the instrument to be calibrated is marked (labels and engravings) and, if available, has the serial number.
- Basic check (value display, slide movement, condition). If out of order, inform customer.
- Check calibration of measurement standard.
- If necessary, clean the exterior with a soft cloth.
  Solvent used: Mild detergent, isopropyl alcohol (except on the window), light benzine.
- Store in ambient calibration conditions for at least 5 hours before measurement.

3.2. Visual inspection

- Check that the instrument is free from any signs of impact, corrosion or inappropriate wear that could affect calibration.
- Check that the identification number and/or serial number are clearly visible.
- Check display, number of digits, range and counting direction.

3.3. Functional check

- Check that the slider moves smoothly over its entire travel (no hard points).
- Check operation of buttons (on/off, zero, mode).
- Check display stability. Maximum deviation of 1 digit for 10 seconds.
- Check the data output by connecting the instrument to a PC or a Sylvac display.

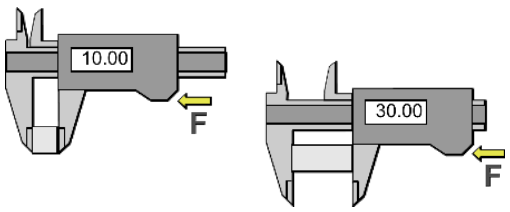
4. CALIBRATION SPECIFICATIONS

4.1. Error of indication – External measurement, limited area contact (E_{MPE})

- Use gauge blocks from 10 to 300 mm.
- Make a minimum of 6 measurements distributed as evenly as possible over the measurement range.

There are 2 possible methods:

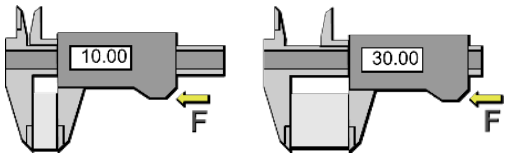
A. To carry out the measurements: Position the gauges in contact according to the width of their measuring faces, at different positions on the external jaws (see Figure) and different length over the measuring range.



B. Take the measurements in 2 phases:

1. Position the gauges in full contact and take several measurements over the measuring range.
2. Check the parallelism with a gauge block (between 5 and 25 mm). Check both ends of the jaws.

B1.



B2.

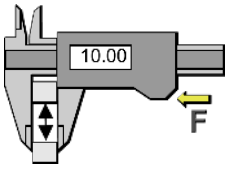


Table 4.1.1.

	Maximum permissible error(1) E_{MPE}	Δmax(2) of external measurements error
Up to 150 mm	0.02 mm	0.03 mm
More than 150 up to 300 mm	0.03 mm	0.04 mm
150 mm Micron Resolution	0.015 mm	0.020 mm
200 mm Micron Resolution	0.025 mm	0.030 mm

(1) The maximum permissible error is the deviation from zero (±)

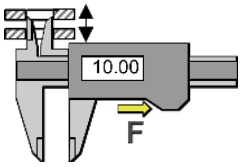
(2) Δ max is the maximum extent of the measured errors (max – min)

4.2. Error of indication – Internal measurement, offset error S_{EMT}

- Use two gauge rings (Ø5 and Ø25 mm) for the inner jaws.
- Measure the Ø5mm ring.
- Measure the Ø25mm ring at each end of the inner jaws measuring surfaces.

Table 4.2.1.

	Offset error S_{EMT}
Calipers 150 / 200 & micron	0.03 mm
Calipers 300	0.04 mm

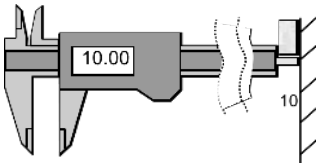


4.3. Error of indication – Depth measurement

- Take a depth measurement (depth rod) on a 10 mm gauge block placed on a flat, smooth measuring table or using a specific gauge.

Table 4.3.1.

	Depth measurement
Calipers 150 / 200 / 300	0.02 mm

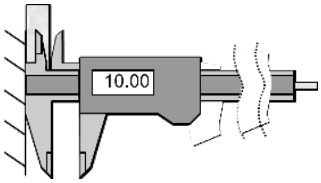


4.4. Error of indication – Shoulder measurement

- Take a shoulder measurement on a 10 mm gauge block placed on a flat, smooth measuring table or using a specific gauge.

Table 4.4.1.

	Max. permitted error on 10 mm
Calipers 150 / 200 / 300	0.02 mm



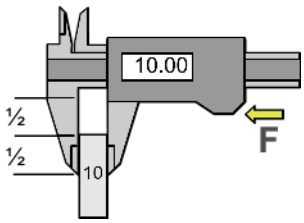
4.5. Repetability

Repeatability is not systematically checked during calibration. If necessary, it can be checked as follows:

- Take 5 successive measurements of a gauge block (between 5 and 25 mm), engaged at approximately half the length of the jaws (from the tip).

Table 4.5.1.

	Δ max repetability
Calipers 150 / 200 / 300	0.01 mm
Calipers Micron Resolution	0.004 mm



5. RESULTS AND DECISION

- Establish a calibration certificate. The measurements covered by the calibration certificate must be at least:
  - 4.1. Error of indication - External measurement
  - 4.2. Error of indication - Internal measurement
- If the instrument does not comply with the calibration specifications, the result will be communicated to the customer.
- The calibration specifications defined in this Sylvac standard comply with ISO 13385-1.