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DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR VERNIER CALIPERS, TYPE 1 CLASSES 1, 2, AND 3

Headquarters, Department of the Army, Washington, DC
30 October 1988

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*This bulletin supersedes TB 9-5210-208-50, 22 June 1966.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Vernier Calipers, Type 1, Classes 1, 2, and 3 (fig. 1). Federal Specification GGG-C-0111b and MILSTD-120 were used as the prime data sources in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

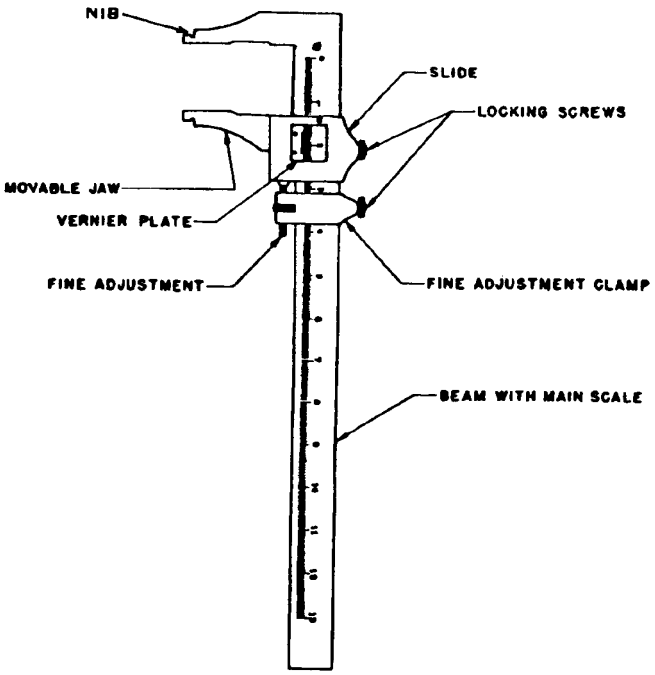

Figure 1. Caliper, vernier - typical view.

a. Model Variations. Type 1: Caliper, vernier; Class 1: English measure, Class 2: Metric measure, Class 3: English and metric measure.

b. Time and Technique. The time required for this calibration is approximately 1 hour, using the physical technique.

2. Forms, Records, and Reports

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

b. Adjustments to be reported are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

3. Calibration Description. TI parameters and performance specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Length measurement	Range: Class 1: 0 to 48 in. Class 2: 0 to 900 mm Class 3: 0 to 36 in. and 0 to 900 mm Accuracy: ± 0.001 in. per each 12 in. of beam length

SECTION II
EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set AN/GSM-286. Alternate items may be used by the calibrating activity when the equipment listed in table 2 is not available. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI.

5. Accessories Required. The accessories required for this calibration are common usage accessories issued as indicated in paragraph **4** above, and are not listed in this calibration procedure.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
GAGE BLOCKS (8 PIECE SET)	Range: 0 to 48 in Accuracy: Grade 3	(7915946)
GAGE BLOCK (81 PIECE SET)	Range: 0.050 to 4 in. Accuracy: Grade 3	(7901961)

SECTION III
CALIBRATION PROCESS

6. Preliminary Instructions

a. The instructions outlined in paragraphs 6 and 7 are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name as listed in table 2.

c. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in the manufacturer's manual for this TI.

d. Unless otherwise specified all controls and controls settings refer to the TI.

7. Equipment Setup

a. Remove TI from protective case.

b. Visually inspect TI for any damage that will affect the accuracy of measurement.

c. Slide movable jaw along full length of beam to determine if roughness, binding, or irregularities occur.

d. If necessary, clean TI and apply a small quantity of instrument oil.

e. Select a clean work area and allow unit under test and gage blocks to stabilize at existing temperature.

NOTE

To calibrate a TI graduated in the metric system, it will be necessary to convert the metric reading to applicable length in inches. Formula: 1 mm = 0.03937 inch, or 1 inch = 25.4 mm.

8. Outside Scale

a. Performance Check

(1) Close jaws of TI. Vernier scale marked "outside" should read 0.

(2) Use appropriate size gage blocks to check midscale and full scale indications on TI.

(3) Lay gage block stack, firmly wrung together, on surface plate or table top with both ends of working surfaces exposed.

(4) Place inside of jaws of TI over ends of gage block working surfaces. Make a setting, utilizing fine adjustment clamp, fine adjustment nut, and locking screws as required. If reading is not within ±0.001 inch of total length of gage blocks (for first 12 inches of beam plus 0.001 inch for each additional 12 inches of the beam), perform **b** below.

b. Adjustments

(1) Loosen screws that fasten outside vernier plate to slide assembly.

(2) Reposition vernier plate to position that best compensates for errors at 0, midscale, and full scale.

(3) Tighten screws to secure vernier plate.

9. Inside Scale

a. Performance Check

(1) Use appropriate size gage blocks to check minimum scale, midscale, and full scale indications on TI "inside" scale.

(2) Assemble gage blocks as shown in figure 2 with an inside caliper jaw at each end, which serves as an end stop. Wring blocks together firmly before applying tie rods.

(3) Place nibs of TI jaws between inside caliper jaws of assembled gage block stack. Make a setting, utilizing fine adjustment clamp, fine adjustment nut, and locking screws as required. If reading is not within +0.001 inch of total length of gage blocks (for first 12 inches of beam plus 0.001 inch for each additional 12 inches of the beam), perform **b** below.

b. Adjustments

(1) Loosen screws that fasten inside vernier plate to slide assembly.

(2) Reposition vernier plate to position that best compensates for errors at minimum scale, midscale, and full scale.

(3) Tighten screws to secure vernier plate.

10. Final Procedure

a. Disconnect all equipment.

b. Annotate and affix DA Label/Form in accordance with TB 750-25.

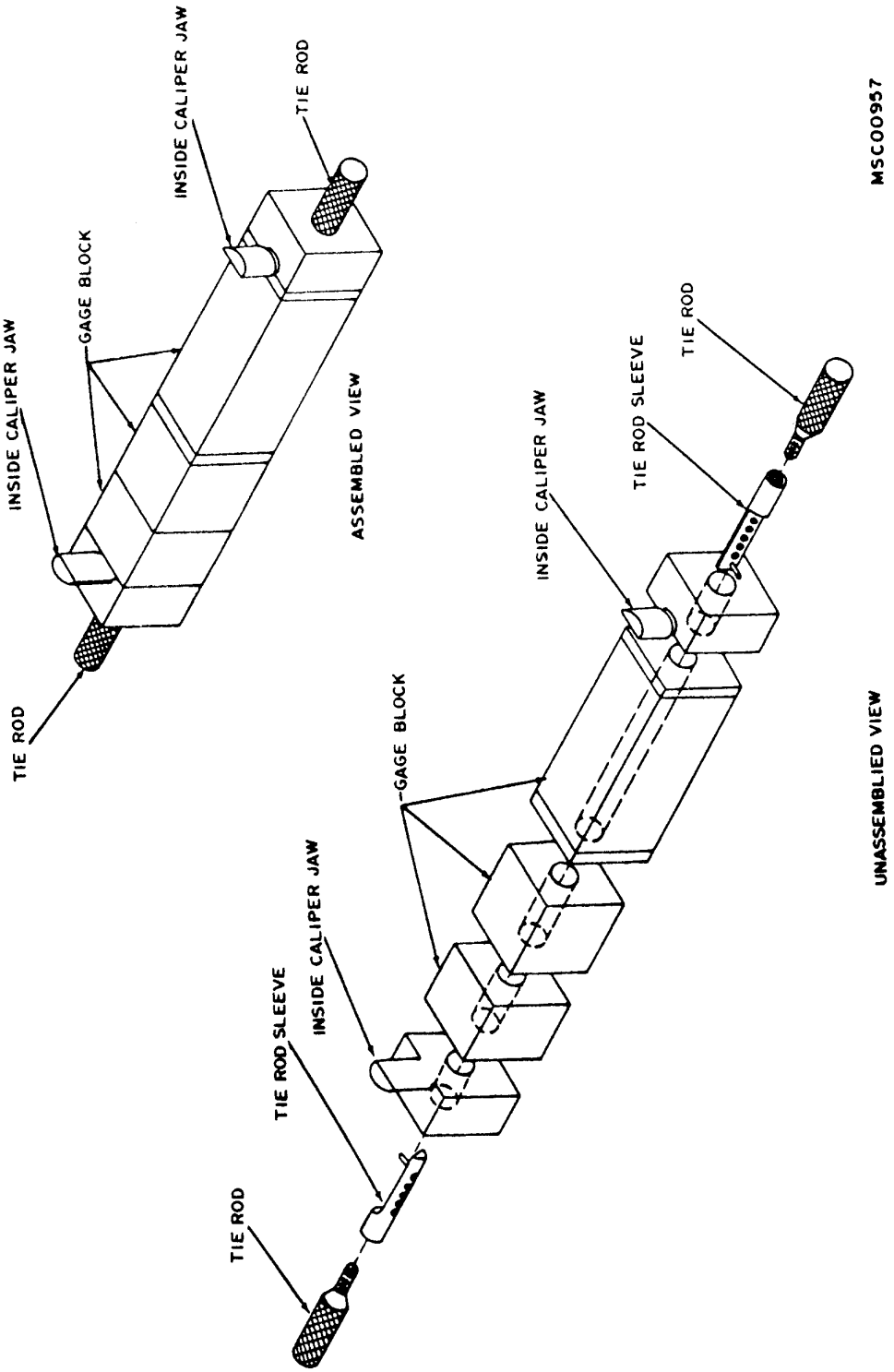

Figure 2. Block assembly.

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