DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR TESTER, AIR LEAKAGE (DRY BUBBLE), Q204 NSN 6665-01-024-0529

Headquarters, Department of the Army, Washington, DC
28 June 1977

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SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Tester, Air Leakage, (Dry Bubble), Q204. The equipment being calibrated will be referred to as the "TI" or test equipment throughout this bulletin.

a. Model Variations. None

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

2. Calibration Data Card (DA Form 2416). Forms, records, and reports required for calibration personnel at all levels are prescribed by TM 38-750. DA Form 2416 must be annotated in accordance with TM 38-750 for each calibration performed.

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
Vacuum	Range: 0 to 8 inches of water Accuracy: ± 2% of full scale

SECTION II
EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment used in this calibration. The equipment is issued with secondary transfer standards calibration set, NSN 6695-00-621-7877. 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 accuracy ratio between the standard and TI. When the four-to-one ratio cannot be met, the actual accuracy of the equipment selected is shown in parenthesis.

5. Accessories Required. The accessories listed in table 3 are issued as indicated in paragraph 4 above except for one which is fabricated as shown in figure 1. All are to be used in this calibration procedure. When necessary, the items other than the one fabricated may be substituted by equivalent items.

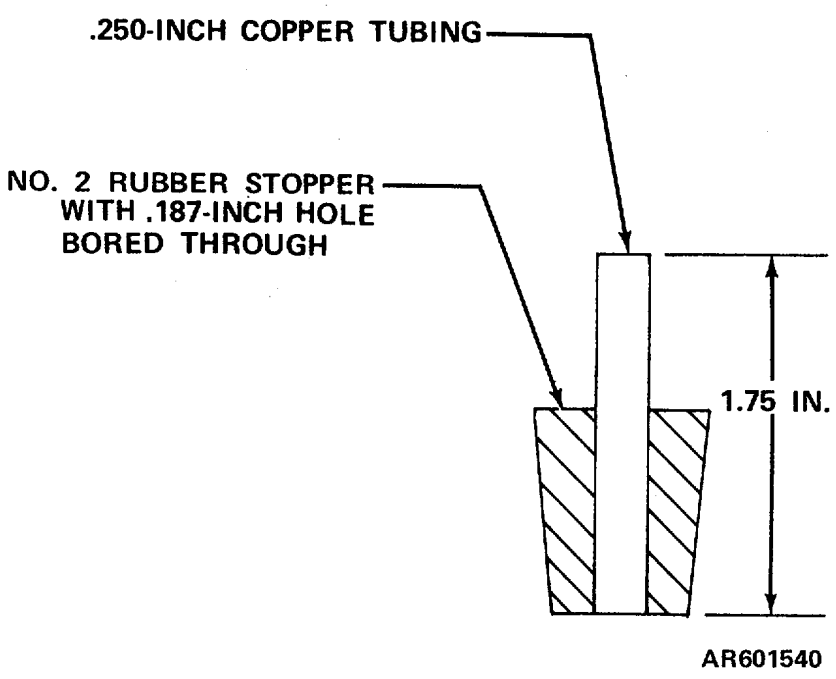

Figure 1. Fabrication instructions for connector (B4).

Table 2. Minimum Specifications of Equipment Required.

Item	Common name	Minimum use specifications	Manufacturer, model, and part number
A1	MANOMETER	Range: 0 to 8 inches of water Accuracy: ±0.5%	Wallace and Tiernan, Model 65D-4C-0120X or FA145600 (7912573).

Table 3. Accessories Required

Item	Common name	Description and part number
B1	TUBING	Plastic, ¼ - inch (R3603F) length as required. (NSN 9330-00-071-5373).
B2	CONNECTOR [1]	Fabricate in accordance with figure 1.
B3	STOPPER [2]	Pyrex, standard taper, ground joint, 8mm dia. At large end of ground zone, corning glass works, part no. 410981.

[1] Also used to calibrate the following equipment:
Tester, Leakage, Valve Assembly, Q210 (TB 3-6665-314-50)
Indicator, Resistance, Inhalation and Exhalation, Q213 (TB 3-6665-315-50).
[2] Additional equipment required.

SECTION III
CALIBRATION PROCESS

NOTE

Unless otherwise specified, verify the results of each test and take corrective action whenever the test requirement is not met before continuing with the calibration.

6. Preliminary Instructions. *a.* The instructions outlined in this section are preparatory to the calibration process. Personnel should become familiar with the entire bulletin (or specified sections) before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name and item identification number as listed in tables 2 and 3. For the identification of equipment referenced by item numbers prefixed with A, see table 2, and for prefix B, see table 3.

7. Equipment Setup (fig. 2). *a.* Adjust mechanical zero-adjustment on TI gage to zero.

b. Set POWER switch to OFF.

c. Turn BLEED VALVE fully counterclockwise.

d. Set TEST-VERIFICATION control to TEST.

e. Connect power cable connector to 115-volt, 60 Hz receptacle.

f. Set POWER switch to ON. Motor should operate.

g. Allow TI to operate for at least 10 minutes.

h. Check that the water level in the bubbler assembly is approximately 2 inches above the tip of the submerged tube.

NOTE

Add water to the bubbler assembly through the fill port on top of the assembly and remove water by opening the drain cock at the bottom of the bowl.

i. Close the fill port.

j. Slowly turn the BLEED VALVE clockwise until bubbles form at the tip of the tube in the bubbler assembly. This should occur when the gage indicates approximately 2 inches of water.

k. Decrease the reading by one graduation. The formation of bubbles should stop.

l. Insert the stopper (B3) into the canteen cap adapter.

m. Turn the BLEED VALVE to obtain a reading of 8 inches of water on the gage. No bubbles should appear.

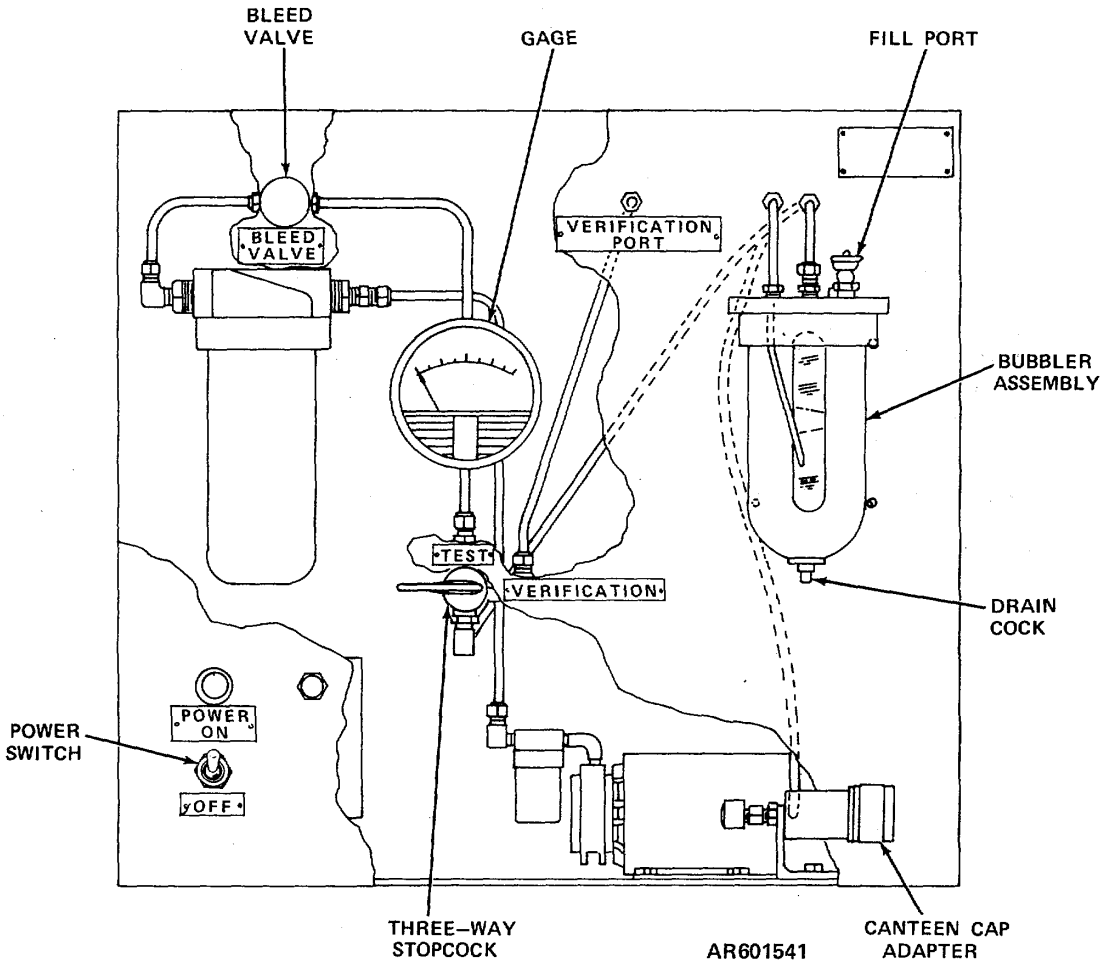

Figure 2. Location of TI controls and instruments used during calibration.

8. Gage. *a. Performance check.*

(1) Connect the test equipment as shown in figure 3.

(2) Set fill cup valve handle to open.

(3) Slowly turn BLEED VALVE clockwise until the gage pointer indicates at 1 inch of water on the scale. The manometer (A1) must indicate as shown in table 4.

(4) Repeat (3) above for each major division (cardinal point) on the gage scale.

CAUTION

Since a sudden change in pressure could damage the TI, do not disconnect the equipment before returning the TI to atmospheric pressure.

(5) After the performance check is completed, slowly open the BLEED VALVE to return the TI to atmospheric pressure.

(6) Remove connector (B2) from the fill port, close the fill cup valve, and remove the stopper (B3) from the canteen cup adapter.

Table 4. Gage Performance Limits

Scale major division indication	Acceptable manometer indications (inches of water)	
	Min.	Max.
1	0.84	1.16
2	1.84	2.16
3	2.84	3.16
4	3.84	4.16
5	4.84	5.16
6	5.84	6.16
7	6.84	7.16
8	7.84	8.16

b. Adjustments.

(1) Turn the BLEED VALVE to obtain an indication of 2 inches of water (corrected) on the gage.

(2) If bubbles form at the tip of the tube, open the fill cup valve, add a small quantity of water, and close the fill cup.

(3) Repeat (2) above until the bubbles no longer form.

(4) Turn the BLEED VALVE to increase the gage reading by one graduation (corrected). Bubbles should form at the tip of the tube.

(5) If bubbles do not form, slowly open the drain cock at the bottom of the bubbler assembly bowl, and allow the water to drain until bubbles form.

(6) Repeat (1) through (5) above as necessary until no bubbles form at a corrected 2 inches of water gage reading and start to form at one graduation lower.

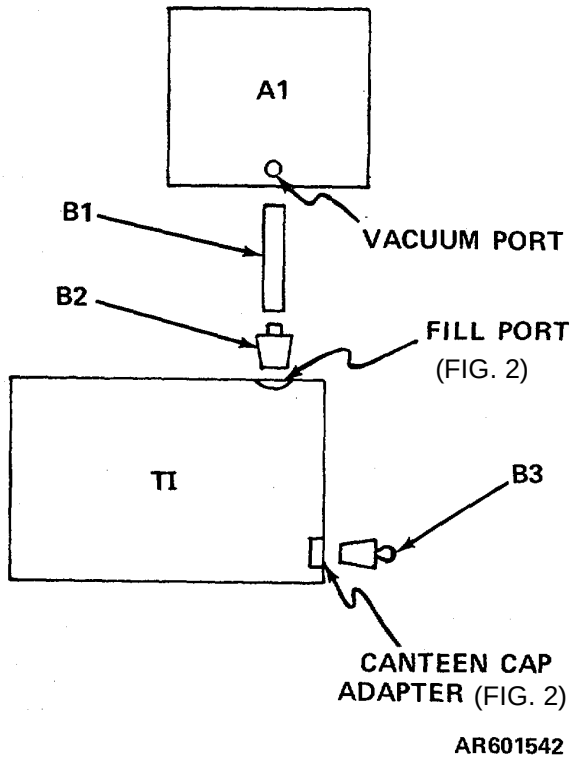

Figure 3. Gage performance test equipment setup.

9. Final Procedure. *a.* Close the fill cup valve. Deenergize and disconnect all equipment.

b. In accordance with TM 38-750, annotate and affix DA Label 80 (US Army Calibration System). When the TI does not indicate within the limits specified in table 4, annotate and affix DA Form 2417 (Unserviceable or Limited Use) tag.

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

PAUL T. SMITH
Major General, United States Army
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