

*TB 11-6625-799-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR DYNAMOTOR TEST SET I-199 and I-199A (NSN 6625-00-229-1085)

Headquarters, Department of the Army, Washington, D.C.
13 July 1976

REPORTING OF ERRORS

You can help improve this publication by calling attention to errors and by recommending improvements and stating your reason for the recommendations. Report such recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms), and mail it direct to Commander, U.S. Army Electronics Command, ATTN: PRSEL-MA-Q, Fort Monmouth, N.J. 07703. A reply will be furnished direct to you.

SECTION		Paragraph	Page
I.	IDENTIFICATION AND DESCRIPTION		
	Test instrument identification	1	2
	Calibration data card, DA Form 2416	2	2
	Calibration description	3	2
II.	EQUIPMENT REQUIREMENTS		
	Equipment required	4	3
	Accessories required	5	3
III.	PRELIMINARY OPERATIONS		
	Preliminary instructions	6	4
	Equipment setup	7	4
IV.	CALIBRATION PROCESS		
	Input Current (TOE 29-134H only)	8	5
	Input current (AN/GSM-256 only)	9	5
	Input voltage	10	6
	Output current	11	6
	Output voltage	12	7
	Output ripple (TOE 29-134H only)	13	7
	Output ripple (AN/GSM-256 only)	14	7
	Input ripple (TOE 29-134H only)	15	8
	Input ripple (AN/GSM-256 only)	16	9
	Output load resistance	17	9
Final procedure	18	9	

*This bulletin supersedes TB 11-6625-799-35/1, 12 September 1969.

SECTION I IDENTIFICATION DESCRIPTION

1. Test Instrument Identification. **This bulletin provides instructions for the calibration of Dynamotor Test Set I-199 and I-199A. The manufacturer's instruction manuals were used as the prime data source in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.**

a Model Variations. Variations among models are described in text.

calibration is approximately 3 hours per instrument, using the d.c. and low frequency 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

TI parameters	Performance specifications.
Input current	0 to 60 adc $\pm 3\%$ full scale
Input voltage	0 to 60 vdc $\pm 3\%$ full scale
Input ripple, Model I-199 Model I-199A(1) Model I-199A(2)	0 to 120 vac $\pm 3\%$ full scale 0 to 30 vac $\pm 3\%$ full scale 0 to 3 vac $\pm 3\%$ full scale
Output current	0 to 600 ma dc $\pm 3\%$ full scale
Output voltage	0 to 1200 vdc $\pm 3\%$ full scale
Output ripple	0 to 120 vac $\pm 3\%$ full scale

SECTION II

EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment used in this calibration procedure. This equipment is issued with Secondary Transfer Standards Calibration Set AN/GSM-256, NSN 4931-00-525-8175, and TOE 29-134H and is to be used in performing this procedure. 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. Where 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 with Secondary Transfer Standards Calibration Set AN/GSM-256, NSN 4931-00-525-8175, and TOE 29-134H and are to be used in this calibration procedure. When necessary, these items may be substituted by equivalent items unless specifically prohibited.

Table 2. Equipment Required

Item numbr.	Common name	Minimum use specifications	Calibration equipment, manufacturer, model, and part number ¹	
			AN GSM-256	TOE 29-134H
A1	AC/DC VOLTMETER	Range: 0.065 to 108.6 vac Range: ² 1.82 to 63.6 mvdc Accuracy: $\pm 0.75\%$	Hewlett-Packard, Model 3490A op 060 (6625-00-557-8305)	Electrical Voltmeter ME-202/U
A2	AC POWER AMPLIFIER	Range: 0.065 to 108.6 vac output with 2 vac input	Elgar, Model 121 w/400-A	
A3	CURRENT SHUNT	Range: 0.91 to 31.8 adc Accuracy: $\pm 0.75\%$	Weston, Model 9992 (P/N 41196)	
A4	DC CURRENT SOURCE	Range: 0.91 to 31.8 adc	NJE, Model CS36CR30D2 (7907346-2)	
A5	METER CALIBRATOR	Range: ¹ 0.91 to 51.8 adc Range: 29.1 to 936 vdc Range: 16.4 to 518 madc Accuracy: $\pm 0.75\%$	John Fluke, Model 760A (6625-00-935-7002)	Electrical Meter Test Set TS-682(*)GSM-1
A6	RESISTANCE MEASURING SET	Range: 3100 ohms to infinity Accuracy: $\pm 2.5\%$	Hewlett-Packard, Model 3490 op 060 (6625-00-557-8035)	Multimeter TS-352(*)/U
A7	SIGNAL GENERATOR	Range: ¹ 0.065 to 108.6 vac Range: ² 0.065 to 2.8 vdc Frequency: 2 kHz	Hewlett-Packard, Model 652A (Mis-10224)	Signal Generator TS-421(*)/U

¹ TOE 29-134H only

² AN/GSM-256 only

³ The calibration equipment utilized in this procedure was selected from those known to be available at Department of Defense facilities, and the listing by make or model number carries no implication of preference, recommendation, or approval by the Department of Defense for use by other agencies. It is recognized that equivalent equipment produced by other manufacturers may be capable of equally satisfactory performance in the procedure.

Table 3. Accessories Required

Item number	Common name	Description and part number
B1	ADAPTER	Single banana jack to spade lug, red (7907502-2).
B2	ADAPTER	Single banana jack to spade lug, black (7907502-1).
B3	ADAPTER	Single banana jack to alligator clip, red (7907556).
B4	ADAPTER BOX	High voltage isolation box (SKD 4850-3)
B5	CABLE	30-in., RG-58/U with double banana plug terminations (7907470).
B6	CABLE	36-in., RG-58/U BNC plug to alligator clips (7909410).
B7	LEAD	High current lead with spade lug terminations (7911292-18).
B8	LEAD ¹	High current lead with spade lug terminations (7911292-14).
B9	LEAD	24-in., with single banana plug terminations, red (7907497).
B10	LEAD	24-in., with single banana plug terminations, black (7907498).

¹ Two required.

SECTION III PRELIMINARY OPERATIONS

6. Preliminary Instructions. **a. The instructions outlined in this section 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 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.

WARNING

HIGH VOLTAGE is used during the performance of this calibration. DEATH ON CONTACT may result if personnel fail to observe safety precautions.

7. **Equipment Setup.** a Remove TI from its protective cover.

b. If TI INPUT meter does not indicate zero, adjust to zero using adjustment screw located below meter face.

c. Repeat b above for TI OUTPUT meter.

SECTION IV 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.

8. Input current (TOE 29-134H only). a. Performance Check

(1) Connect meter calibrator (A5) to TI BAT + and DYNAMOTOR L.V. + binding posts, using leads and adapters (B9, B10, B1, and B2).

(2) Position TI controls as listed below:

- (a) INPUT selector switch to AMP.**
- (b) INPUT CURRENT switch to LOW.**
- (c) INPUT RHEO. control fully clockwise.**

(3) Depress and hold TI INPUT-LOW-12 AMPS-3 AMPS pushbutton while adjusting meter calibrator d.c. output current until TI INPUT meter indicates 3 amperes. Meter calibrator will indicate between 2.91 and 3.09 amperes dc.

(4) Repeat technique of (3) above at TI INPUT meter indications listed in table 4. Meter calibrator will indicate within limits specified.

b. Adjustments. No adjustments can be made.

Table 4 Input Current

TI INPUT meter indication (amperes)	Meter calibrator indication (amperes)	
	Min	Max
2.5	2.41	2.59
2.0	1.91	2.09
1.5	1.41	1.59
1	0.91	1.09
12 ¹	11.64	12.36
30 ²	29.1	30.9
50 ³	48.2	51.8

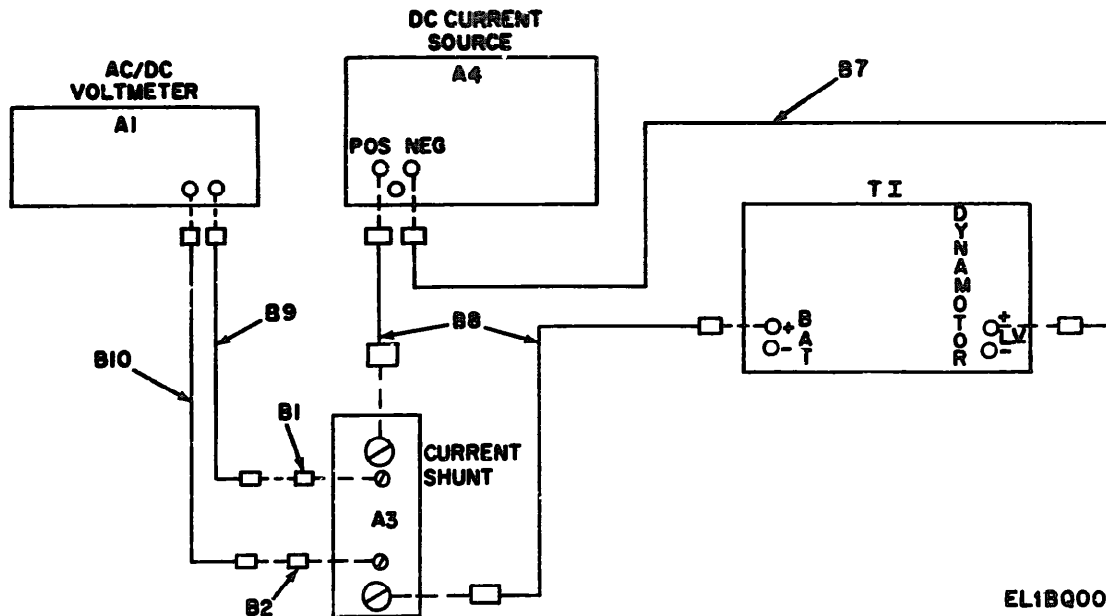
¹ Release INPUT-LOW-12 AMPS-3 AMPS pushbutton

² Set INPUT CURRENT switch to HIGH and depress and hold INPUT-HIGH-60 AMPS-30 AMPS pushbutton

³ Release INPUT-HIGH-60 AMPS-30 AMPS pushbutton Do not exceed 51.8 amperes to TI

9. Input Current (AN/GSM-256 only). a. Performance Check

(1) Connect equipment as shown in figure 1.



EL1BQ001

Figure 1 Input current, equipment setup

(2) Position TI controls as listed below:

- (a) INPUT selector switch to AMP.
- (b) INPUT CURRENT switch to LOW.
- (c) INPUT RHEO. CONTROL FULLY CLOCKWISE.

(3) Depress and hold TI INPUT-LOW-12 AMPS-3 AMPS pushbutton while adjusting d.c. current source

(A4) until TI INPUT meter indicates 3 amperes. A.c./d.c. voltmeter (A1) will indicate between 5.82 and 6.18 millivolts dc.

(4) Repeat technique of (3) above at TI INPUT meter indications listed in table 5. A.c./d.c. voltmeter will indicate within limits specified.

b. *Adjustments.* No adjustments can be made.

Table 5 D.c. Current

TI INPUT meter indication (amperes)	A.c./d.c. voltmeter indication (mVdc)	
	Min	Max
2.5	4.82	5.18
2.0	3.82	4.18
1.5	2.82	3.18
1	1.82	2.18
12 ¹	23.28	24.72
30 ²	58.2	61.8
30 ³	56.4	63.6

¹ Release INPUT-LOW-12 AMPS-3 AMPS pushbutton.

² Set INPUT CURRENT switch to HIGH, and depress and hold INPUT-HIGH-60 AMPS-30 AMPS pushbutton

³ Release INPUT-HIGH-60 AMPS-30 AMPS pushbutton.

10. Input Voltage. a. *Performance Check*

(1) Connect meter calibrator (A5) to TI BAT + and - binding posts, using leads and adapters (B9, B10, B1, and B2).

(2) Set DYN. ON-OFF-HAND GEN. ON switch to DYN. ON and INPUT selector switch to VOLTS.

(3) Depress and hold INPUT-60 VOLTS-30 VOLTS pushbutton.

(4) Adjust meter calibrator d.c. voltage output until TI INPUT meter indicates 30 volts. Meter calibrator

will indicate between 29.1 and 30.9 volts dc.

(5) Release INPUT-60 VOLTS-30 VOLTS pushbutton.

(6) Adjust meter calibrator d.c. voltage output until TI INPUT meter indicates 60 volts. Meter calibrator will indicate between 58.2 and 61.8 volts d.c.

b. *Adjustments.* No adjustments can be made.

11. Output Current. a. *Performance Check*

(1) Connect meter calibrator (A5) to center terminal of H.V. LOAD FINE ADJ rheostat (located on

rear chassis) and DYNAMOTOR OR HAND GEN. H.V. - binding post, using leads and adapters (B9, B10, B2, and B3).

(2) Turn OUTPUT selector switch to MA.

(3) Depress and hold OUTPUT-600 MA-120 MA pushbutton while adjusting meter calibrator d.c. output current until TI OUTPUT current meter indicates

120 milliamperes. Meter calibrator will indicate between 116.4 and 123.6 milliamperes.

(4) Repeat technique of (3) above at TI OUTPUT meter indications listed in table 6. Meter calibrator will indicate within limits.

b. Adjustments. No adjustments can be made.

Table 6. Output Current

TI OUTPUT meter indications	Meter calibrator indications (milliamperes d.c.)	
	Min	Max
100	96.4	108.6
80	76.4	83.6
60	56.4	63.6
40	36.4	43.6
20	16.4	23.6
500 ¹	482	518

¹ Release OUTPUT-600 MA-120 MA pushbutton before performing this check. Do not exceed 518 milliamperes input to TI. Perform check as rapidly as possible.

12. Output Voltage. *a. Performance Check*

(1) Connect meter calibrator (A5) to TI DYNAMOTOR OR HAND GEN H.V. + and - binding posts, using leads and adapters (B9, B10, B1 and B2).

(2) Turn H.V. LOAD COARSE ADJ. control fully counterclockwise (OFF position) and OUTPUT selector switch to VOLTS.

(3) Depress and hold OUTPUT-1200 VOLTS-300 VOLTS pushbutton while adjusting meter calibrator dc voltage output until TI OUTPUT meter indicates 300 volts. Meter calibration will indicate between 291 and 309 volts dc.

(4) Release OUTPUT-1200 VOLTS-300 VOLTS pushbutton.

(5) Adjust meter calibrator dc voltage output until TI OUTPUT meter indicates 300 volts. Meter calibrator will indicate between 864 and 936 volts d.c.

b. Adjustments. No adjustments can be made.

13. Output Ripple (TOE 29-134H only). *a. Performance Check*

(1) Connect signal generator (A7) to TI DYNAMOTOR OR HAND GEN H.V. + and - binding posts, using leads and adapters (B9, B10, B1 and B2). Monitor signal generator output with a.c./d.c. voltmeter (A1) using cable (35).

(2) Turn TI OUTPUT selector switch to RIPPLE and H.V. LOAD COARSE ADJ. control fully clockwise.

(3) Adjust signal generator output impedance to 5,000 ohms and frequency to 2 kHz.

(4) Adjust signal generator output voltage until TI

OUTPUT meter indicates 100 volts. A.c./d.c. voltmeter will indicate between 96.4 and 108.6 volts a.c.

WARNING

Do not touch open wires and connections to change setup or remake connections without first reducing generator output voltage. Dangerous voltages are present.

(5) Adjust signal generator output impedance to 600 ohms.

(6) Depress and hold OUTPUT-RIPPLE-W VOLTS-12 VOLTS pushbutton and adjust signal generator output voltage until TI OUTPUT meter indicates 12 volts. A.c./d.c. voltmeter will indicate between 11.64 and 12.36 volts ac.

(7) Release OUTPUT-RIPPLE-120 VOLTS-12 VOLTS pushbutton.

(8) Adjust signal generator output impedance to 50 ohms.

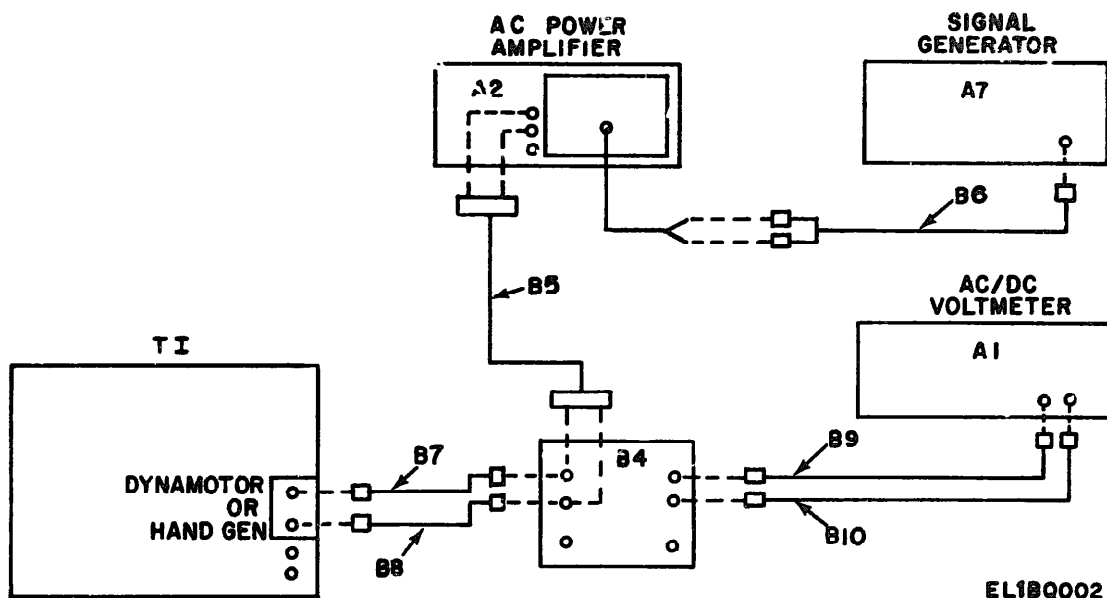
(9) Depress and hold OUTPUT-RIPPLE-120 VOLTS-3 VOLTS pushbutton and adjust signal generator output voltage until TI OUTPUT meter indicates 3 volts. A.c./d.c. voltmeter will indicate between 2.91 and 3.09 volts a.c.

(10) Release OUTPUT-RIPPLE-120 VOLTS-3 VOLTS pushbutton.

b. Adjustments. No adjustments can be made.

14. Output Ripple (AN/GSM-256 only). *a. Performance Check*

(1) Connect equipment as shown in figure 2.



EL1BQ002

Figure 2. Output ripple, equipment setup

(2) Turn TI OUTPUT selector switch to RIPPLE and H.V. LOAD COARSE ADJ. control fully cl&wise.

(3) Adjust signal generator (A7) frequency to 2 kHz and output amplitude sufficient to drive a.c. power amplifier (A2).

(4) Adjust a.c. power amplifier output until TI OUTPUT meter indicates 100 volts. A.c./d.c. voltmeter (A1) will indicate between 96.4 and 103.6 volts a.c.

WARNING

Do not touch open wires and connections to change setup or remake connections without first reducing generator output voltage.

Dangerous voltages are present.

(5) Depress and hold OUTPUT-RIPPLE-120 VOLTS-12 VOLTS pushbutton and adjust ac power amplifier voltage until TI OUTPUT meter indicates 12 volts. A.c./d.c. voltmeter will indicate between 11.64 and 12.36 volts ac.

(6) Release OUTPUT-RIPPLE-120 VOLTS-12 VOLTS pushbutton.

(7) Depress and hold OUTPUT-RIPPLE-120 VOLTS-3 VOLTS pushbutton and adjust ac power amplifier output voltage until TI OUTPUT meter indi-

cates 3 volts. A.c./d.c. voltmeter will indicate between 2.91 and 3.09 volts ac.

(8) Release OUTPUT-RIPPLE-120 VOLTS-3 VOLTS pushbutton.

b. Adjustments. No adjustments can be made.

15. Input Ripple (TOE 29-134H only). a. Performance Check

(1) Connect signal generator (A7) to TI BAT + and DYNAMOTOR L.V. + binding posts, using leads and adapters (B9, B10, B1, and B2). Monitor signal generator output with a.c./d.c. voltmeter (A1) using cable (B5).

(2) Turn TI INPUT selector switch to RIPPLE and INPUT CURRENT switch to HIGH.

(3) Adjust signal generator impedance to 50 ohms and frequency to 2 kHz.

(4) Adjust signal generator output voltage for TI INPUT meter indication of 100, 30, 3, or 0.3 volts for the applicable model listed in table 7. Depress applicable pushbutton. A.c./d.c. voltmeter will indicate within limits specified.

b. Adjustments. No adjustments can be made.

Table 7 Input Ripple

Model	INPUT-RIPPLE pushbutton	A.c./d.c. voltmeter indication (vac)	
		Min	Max
I-100	120 VOLTS-30 VOLTS Released	2.2	2.8
	Depressed	0.66	0.8
I-100A(1)	30 VOLTS-3 VOLTS Released	2.2	2.8
	Depressed	0.66	0.8

Table 7. Input Ripple-Continued

Model	INPUT-RIPPLE pushbutton	A.c./d.c. voltmeter indication (vac)	
		Min	Max
I-199A(2)	3 VOLTS-0.3 VOLTS Released	0.65	0.8
	Depressed	0.065	0.08

16. Input Ripple (AN/GSM-256 only). **a. Performance Check**

(1) Connect equipment as shown in figure 2, except connect to TI BAT + and DYNAMOTOR L.V. + binding posts.

(2) Turn TI INPUT selector switch to RIPPLE.

(3) Adjust signal generator (A7) frequency to 2 kHz and output amplitude sufficient to drive a.c. power amplifier (A2).

(4) Adjust a.c. power amplifier output voltage for TI INPUT meter indications of 100, 30, 3, or 0.3 volts for applicable TI models listed in table 7. Depress applicable pushbutton. A.c./d.c. voltmeter (A1) will indicate

within limits specified.

b. Adjustments. No adjustments can be made.

17. Output Load Resistance. **a. Performance Check**

(1) Turn TI H.V. LOAD COARSE ADJ and H.V. LOAD FINE ADJ fully counterclockwise.

(2) Connect resistance measuring set (A6) to TI DYNAMOTOR OR HAND GEN H.V. + and - binding posts, using leads and adapters (B9, B10, B1, and B2).

(3) Measure resistance at each position of H.V. LOAD COARSE ADJ switch positions listed in table 8. Resistance-measuring set will indicate within limits specified.

b. Adjustments. No adjustments can be made.

Table 8. Resistance

TI H V LOAD COARSE ADJ switch position	Resistance measuring set indication (ohms)	
	Min	Max
1 (OFF)	Infinity	
2	15,500	18,000
3	13,000	16,000
4	11,500	13,500
5	9,500	11,500
6	7,500	9,500
7	6,000	7,000
8	4,000	5,000
9	3,100	3,900

18. Final Procedure. **a. Deenergize and disconnect all equipment and replace TI protective cover.**

b. In accordance with TM 38-750, annotate and affix DA Label 80 (U.S. Army Calibration System). When

the TI cannot be adjusted within tolerance, annotate and affix **DA** Form 2417 (Unserviceable or Limited Use) (red tag).

By Order of the Secretary of the Army:

Official:
PAUL T. SMITH
Major General, United States Army
The Adjutant General

FRED C. WEYAND
General, United States Army
Chief of Staff

Distribution:
To be distributed in accordance with DA Form 12-34A, Requirements for Calibration Procedures Publications.

* U.S. GOVERNMENT PRINTING OFFICE: 1976-665668/682

DEPARTMENT OF THE ARMY
US ARMY AG PUBLICATIONS CENTER
1655 WOODSON ROAD
ST LOUIS, MISSOURI 63114
OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
OOD 314



END

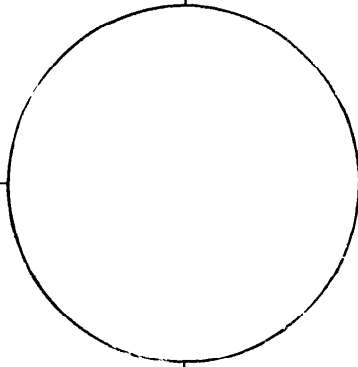
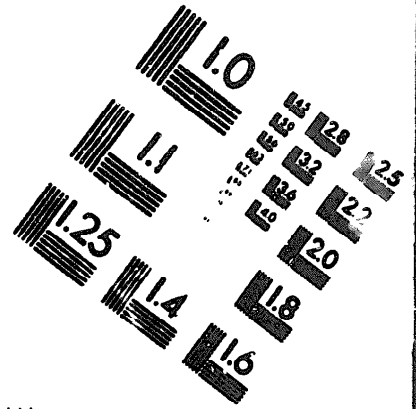
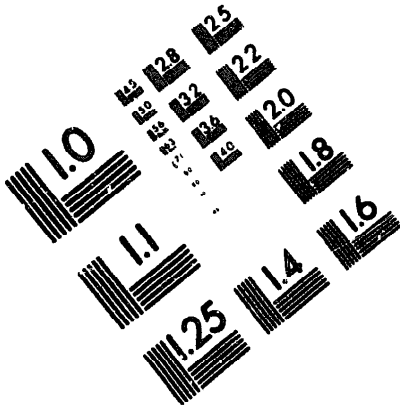
7-18-83

DATE





DEPARTMENT OF THE ARMY
MICROFORM
TEST TARGET



150 MM

1.0 mm (e= 81 mm)

ABCDEFGHIJKLMN OPQRSTU VWXYZ 1234567890
abcdefghijklmnopqrstuvwxyz \$%&'()*+,-./:;=>?@*

1.5 mm (e= 109 mm)

ABCDEFGHIJKLMN OPQRSTU VWXYZ 1234567890
abcdefghijklmnopqrstuvwxyz \$%&'()*+,-./:;=>?@*

2.0 mm (e= 137 mm)

ABCDEFGHIJKLMN OPQRSTU VWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 \$%&'()*+,-./:;=>?@*

2.5 mm (e= 177 mm)

ABCDEFGHIJKLMN OPQRSTU VWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 \$%&'()*+,-./:;=>?@*

1.0 mm (e= 81 mm)

ABCDEFGHIJKLMN OPQRSTU VWXYZ 1234567890
abcdefghijklmnopqrstuvwxyz \$%&'()*+,-./:;=>?@*

1.5 mm (e= 109 mm)

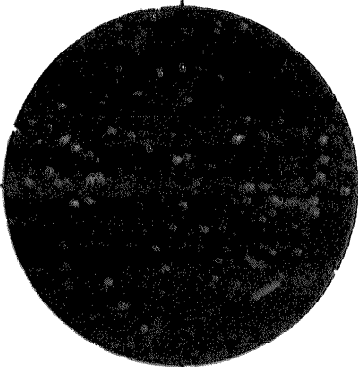
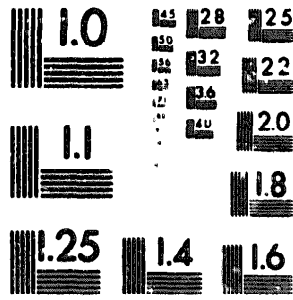
ABCDEFGHIJKLMN OPQRSTU VWXYZ 1234567890
abcdefghijklmnopqrstuvwxyz \$%&'()*+,-./:;=>?@*

2.0 mm (e= 137 mm)

ABCDEFGHIJKLMN OPQRSTU VWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 \$%&'()*+,-./:;=>?@*

2.5 mm (e= 177 mm)

ABCDEFGHIJKLMN OPQRSTU VWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 \$%&'()*+,-./:;=>?@*



200 MM

250 MM

