

MILITARY SPECIFICATION

TEST SET, ELECTRON TUBE, SEMI-AUTOMATIC

AN/USM-118 ()

This amendment forms a part of Military Specification MIL-T-23125A(SHIPS), 27 April 1964.

- # Pages 2 and 3, paragraph 3.2: In line 6, delete comma after "simulate" and add to the last sentence "except for the meter protection circuitry which can be calibrated with external voltmeters".
- # Page 3, paragraph 3.3: In item (c), delete "3.8.3" and substitute "3.8.2.1.4"; item (d), delete "3.8.6" and substitute "3.8.2.1.6"; item (p), delete "3.8.4" and substitute "3.8.2.1.5".
- # Page 10, paragraph 3.4.4.1.5, line 5: Delete "104 to 125" and substitute "103.5 to 126.5".
- # Page 11, paragraph 3.4.4.2.4, line 3: Delete "lead" and substitute "load".
- # Page 12, paragraph 3.4.4.3.3, line 6: Delete "280" and substitute "230".
- # Page 21, paragraphs 3.4.6.2 and 3.4.6.2.1: Delete and substitute"
"3.4.6.2 Calibration cell.- Unless otherwise specified in the contract or order, a non-mercury calibration cell having the following characteristics at 25°C, shall be provided with each equipment:
 - (a) A current source of approximately 50 microamperes when used with card 1C for meter current calibration near the mid-point scale derived from the power supply of the tester.

1/ CHANGES FROM PREVIOUS ISSUE. THE OUTSIDE MARGINS OF THIS DOCUMENT HAVE BEEN MARKED "#" TO INDICATE WHERE CHANGES (DELETIONS, ADDITIONS, ETC.) FROM THE PREVIOUS ISSUE HAVE BEEN MADE. THIS HAS BEEN DONE AS A CONVENIENCE ONLY AND THE GOVERNMENT ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT AS WRITTEN IRRESPECTIVE OF THE MARGINAL NOTATIONS AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE.

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- (b) A voltage source of approximately 12.8 millivolts when used with test card 1D for meter calibration near the mid-scale point derived from the power supply of the tester.
- (c) A resistance network for checking short test sensitivity in conjunction with the proper test cards.
- (d) A resistive network for checking sensitive grid short test sensitivity in conjunction with the proper test cards.

3.4.6.2.1 Cell construction.- The calibration cell shall consist of a low-loss phenolic octal tube base containing the resistors and Zener diode shown on figure 3. This cell shall be hermetically sealed or the interior filled with suitable potting compound to provide protection from shock, vibration and moisture."

Page 22, paragraph 3.4.6.4, line 2: Delete "3.8.6" and substitute "3.8.2.1.7".

Page 22, paragraph 3.4.6.4.3: In line 2: Delete "53" and delete test card 1 and substitute:

<u>Test Card</u>	<u>Actuated Switches</u>
"1B. Zerner Calibration Cell Meter Test Instructions	None (see figure 7)
1C. Meter Calibration UA	A-6, 7, 13, C-13, 16 F-5, H-4, 16, J-17 K-15, L-12, 14
1D. Meter Calibration MV	A-6, 7, 13, C-13, 16, G-5, H-4, 16, J-17, K-15, L-12, 14"

Pages 22 through 24, test card 19A: Add "14" under "actuated switches".

Page 28, paragraph 3.4.6.5.2.1, line 1: Delete "MK-704()/U" and substitute "MK-704()/USM-118A".

Page 29, paragraph 3.4.6.5.2.2, line 1: Delete MK- ()/U" and substitute "MK-827()/USM-118A".

Page 29, paragraph 3.4.6.5.3: Delete and substitute:

"3.4.6.5.2.3 MK-828/USM-118A.- If MK-828/USM-118A is required (see 6.1) a set of programming cards shall be provided to perform the tests specified on the tubes listed in appendix IV. The combination case shall not be furnished with this set of programming cards unless required by the contract or order.

"3.4.6.5.2.4 Alternative card sets.- If required by the contract or order, other cards shall be supplied to or in lieu of those listed in Appendices I through IV."

Page 30, paragraph 3.6.2: Delete and substitute:

"3.6.2 Weight.- The overall weight of the equipment, including the cover and accessories, except the tube test cards and the optional card kits, shall be held to a minimum consistent with requirements specified herein and shall not exceed 55 pounds."

Page 30, paragraph 3.6.5.1: Delete and substitute:

"3.6.5.1 Identification plate.- The identification plate shall be affixed to the outside front of the combination case below the handle."

Page 31, paragraph 3.6.6.3.1.2, line 1: Add "2" after "numeral."

Page 35, paragraph 3.7.2, line 1: After "equipment" add "except for the calibration cell".

Page 37, paragraph 3.8.2.1.4.5.2, line 2: Delete "read" and substitute "red".

Page 42, paragraph 4.5.1.1, items "k" through "p": Delete and substitute:

Equipment	Type
" (k) Voltage source	150 v. + 1.5 v.d.c. with series resistance of 15 k ohms + 1 percent.
" (l) Vibration test machine	See MIL-E-16400
" (m) Shock test machine	See MIL-E-16400
" (n) Temperature, humidity and altitude chamber(s)	Any chamber(s) capable of performing the applicable environmental tests herein.
" (o) Fungus incubator.	See MIL-T-945.
" (p) Tilt table	A table whose top can be horizontal and can be tilted to 75 degrees from the horizontal.

" (g) Special equipment
Weighing scale Detecto or equivalent."

Pages 45 through 47: Delete "cards 67 through 78" and substitute "Cards 67A through 78A" as follows:

<u>Card Number</u>	<u>Function tested</u>	<u>Actuated switches</u>
67A	Filament voltage, 3 volts.	A-9, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 12, 14, 17; D-10, 12, 13; E-17; F-1, 8; G-12, 13, 14, 15; 17; H-13, 14, 15; J-15; L-7, 8, 12.
68A	Filament voltage, 4 volts.	A-9, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 12, 14, 17; D-12, 13; E-10, 17; F-1, 8, 12; G-12, 13, 14, 15, 17; H-13, 14, 15; J-15; L-7, 8, 12.
69A	Filament voltage, 5 volts.	A-9, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 12, 14, 17; D-12, 13; E-17, F-1, 8, 10; G-13, 14, 15, 17; H-12, 13, 14, 15; J-15; L-7, 8, 12.
70A	Filament voltage, 6 volts.	A-9, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 12, 14, 17; D-12, 13; E-17; F-1, 8, 12; G-10, 13, 14, 15, 17; H-12, 13, 14, 15; J-15; L-7, 8, 12.
71A	Filament voltage, 7 volts.	A-9, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 12, 14, 17; D-12, 13; E-17; F-1, 8; G-12, 13, 14, 15, 17; H-10, 12, 13, 14, 15; J-15; L-7, 8, 12.
72A	Filament voltage, 8 volts.	A-9, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 12, 14, 17; D-12, 13; E-17, F-1, 8, 12; G-12, 13, 14, 15, 17, H-12, 13, 14, 15; J-10, 15; L-7, 8, 12.

<u>Card Number</u>	<u>Function tested</u>	<u>Actuated switches</u>
73A	Filament voltage, 9 volts.	A-9, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 14, 17; D-13; E-12, 17; F-1, 8; G-13, 14, 15, 17; H-13, 14, 15; J-12, 15; K-10, L-7, 8, 12.
74A	Filament voltage, 15 volts.	A-11, 12, 13, 14; B-9, 13, 14, 15, 16; C-2, 4, 12, 14, 17; D-12, 13; E-17; F-1, 8, 10; G-12, 13, 14, 15, 17; H-12, 13, 14, 15; J-12, 15; L-7, 8, 12.
75A	Filament voltage, 10 volts.	A-10, 11, 12, 13, 14; B-9, 13, 14, 15, 16; C-2, 4, 14, 17; D-13; E-12, 17; F-1, 8, 12; G-13, 14, 15, 17; H-13, 14, 15; J-12, 15; L-7, 8, 12.
76A	Filament voltage, 20 volts.	A-10, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 9, 12, 14, 17; D-13; E-12, 17; F-1, 8, 12; G-12, 13, 14, 15, 17; H-13, 14, 15; J-15; K-12; L-7, 8, 12.
77A	Filament voltage, 30 volts.	A-10, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 14, 17; D-9, 12, 13; E-12, 17; F-1, 8, 12; G-13, 14, 15, 17; H-12, 13, 14, 15; J-12, 15; K-12; L-7, 8, 12.
78A	Filament voltage, 40 volts.	A-10, 11, 12, 13, 14; B-13, 14, 15, 16; C-2, 4, 12, 14, 17; D-12, 13; E-9, 12, 17; F-1, 8, 12; G-12, 13, 14, 15, 17; H-12, 13, 14, 15; J-15; L-7, 8."

Page 49, paragraph 4.5.1.4: Add "The electrical conditions shall be as listed in the tube test conditions booklet. They shall not be obtained from measurements on an AN/USM-118()."

Pages 49 and 50, paragraph 4.5.1.4: Delete tube type and function of "6A7", "6D6", "6DT6" and "12CX6".

Page 51, paragraph 4.5.3.2.1: Add: "(f) Voltage source."

Page 51, paragraph 4.5.3.2.1.1(b), line 2: Delete "1" and substitute "1B, 1C, 1D".

Page 52, paragraph 4.5.3.3., title: Delete and substitute "Calibration cell test".

Page 52, paragraph 4.5.3.3.1: Delete and substitute:

"4.5.3.1.1 Current and voltage.-

- (a) Connect one end of a 15K, 1 percent, 2W resistor to the (+) terminal of a 150 VDC + 1.5V power supply.
- (b) Connect the other end of the 15K ohm resistor to the Pin 8 of the Zener Calibration Cell.
- (c) Connect the (-) terminal of the power supply to Pin 1 of the Zener Calibration Cell.
- (d) Connect the minus terminal of the Microammeter to Pin 1 of the cell.
- (e) Connect the plus terminal of the Microammeter to Pin 6 of the cell.
- (f) The current shall be numerically equal within 0.5 percent of the "Card 1C" marking on the cell.
- (g) Using the Millivoltmeter, measure the voltage between Pin 1 and Pin 7 (Pin 1 negative).
- (h) The voltage in millivolts shall be numerically equal, within 0.5 percent to the "Card 1D" calibration marking on the cell multiplied by 0.256."

Page 52, paragraph 4.5.3.4.1.1, items (a), (b) and (c): Delete and substitute:

- "(a) Insert card 6 Fixed Bias Cal. Neg. Press button #2. Adjust meter to read 50 with "Bias Cal Neg" control. Remove card 6.
- "(b) Insert card 1C, ZENER CALIB UA. Plug the Zener Calibration Cell into the octal test socket. Push button #2. The meter shall read within +1 division of the figure written on the top blank of the calibration cell cover. If reading is out of tolerance, the meter shall be checked against a meter standard for 50 uA indication at 50 on the 0-100 meter scale. Remove card 1C.
- (c) Insert card 1D, ZENER CALIB MV. Press button #2. The meter shall read within +1 division of the figure written in the bottom blank on the calibration cell cover. If reading is out of tolerance, adjust the "Meter Cal" control for the proper reading. Remove card 1D."

- # Pages 55 and 56, paragraph 4.5.3.4.6, item (e), line 2: Delete "an" and substitute "in".
- # Page 58, paragraph 4.5.3.4.12: In line 4, delete "of" and substitute "on"; delete "3" and substitute "6" and add the following to the last sentence "of the readings on any other equipment in the lot except that the knee test (Card 3) for tube type 6080 shall only be required to reject tubes having more than the rated cut-off current".
- # Page 60, paragraph 4.5.4.3.2(b): Delete "1" and substitute "1B, 1C, 1D" and delete "15" and substitute "15A".
- # Page 60, paragraph 4.5.4.4.1.1: Delete and substitute:
"4.5.4.4.1.1 Meter calibration.- The meter calibration shall be tested as shown on figure 7."
- # Page 61, paragraph 4.5.4.4.2, second sentence: Delete and substitute "Actuate test switch number 2 and filament standardization read switch, and adjust the filament standardization switch for a meter indication of 50 + 1 division. Release the filament read switch. The Meter shall then give the indication shown in the table."
- # Page 64, paragraph 4.5.4.4.6: Add "During all tests of the filament power supply, the input power line voltage shall be monitored with an a.c. voltmeter (see 4.5.1.1(e)), and shall be maintained at 115.00 ± 0.23 volt a.c."
- Pages 64 and 65, paragraph 4.5.4.4.6.1, items (d) and (e): Delete.
- # Page 65, paragraph 4.5.4.4.6.2.1(a), line 3: Delete "IO IP" and substitute "IO Ib".
- Pages 66 and 67, paragraphs 4.5.4.4.6.2.2 and 4.5.4.4.6.2.3: Delete and substitute:
"4.5.4.4.6.2.2 Filament voltage from 3.0 volts through 110 volts.- The filament voltage from 3.0 volts through 110 volts shall be tested as follows:
- (a) Insert test card number 79 in the program switch, actuate test switch number 2, and adjust the Gm balance IO Ib if necessary for zero meter reading.
- # (b) Connect the a.c. voltmeter between pins 3 and 6 of the octal test socket. The voltmeter shall indicate the voltage shown herein for the test card in use within 1 percent.

- # (c) With each of the test cards listed herein inserted in the program switch and test switch number 2 actuated, the meter shall indicate 47 to 53 divisions.

<u>Card Number</u>	<u>Voltage</u>
67A	3.0
68A	4.0
69A	5.0
70A	6.0
71A	7.0
72A	8.0
73A	9.0
74A	15
75A	10
76A	20
77A	30
78A	40
80	50
81	60
82	70
83	80
84	90
85	100
86	110"

Page 67: Add new paragraph 4.5.4.4.6.3:

"4.5.4.4.6.3 Filament standardization calibration.- The calibration of filament standardization switch shall be tested in the following manner:

- (a) With the filament standardization read switch actuated, vary the filament standardization switch. Each switch position change shall give approximately 1 division change in meter indication, except the change from the lowest voltage step to the highest voltage step.
- (b) Set the filament standardization for a meter indication of 49 to 41 division."

Page 67, paragraph 4.5.4.4.9, item (a): First sentence, add "except the cards and optional card kits" and in line 2, delete "50" and substitute "55".

Page 68, paragraph 4.5.5.4.2, line 9: Delete "22" and substitute "22A".

Page 70, paragraph 4.5.5.4.5, item (a): Add "Do not use card 3 of tube type 6080."

Page 71, paragraph 4.5.6.3.1.1, line 4: Delete and substitute "adjustments with cards 2 through 8".

Page 72, table V, column 1: Delete "1" and substitute "1C, 1D".

Page 73, paragraph 4.5.6.3.1.2: In item (b), delete "1" and substitute "1C"; in item (c), line 1, after "number" add "2"; item (d), first sentence, delete and substitute "Remove test card 1C and insert card 1D, actuate test button number 2 and record the panel meter reading."; and in item (e), line 1, delete "1" and substitute "1D".

Page 73, paragraph 4.5.6.3.1.3(k), line 1: Delete "22" and substitute "22A".

Page 74, paragraph 4.5.6.3.1.4(b): Delete "Lo" and substitute "Ib".

Page 74, paragraph 4.5.6.3.1.5, line 1: Delete "Protection and meter protection test" and substitute "Meter protection test".

Page 75, paragraph 4.5.6.3.2: Delete and substitute:

"4.5.6.3.2 Temperature and humidity tests.- During these tests, the calibration cell shall be kept outside of the environmental test chamber except for the time it is being used in accordance with 4.5.6.3.1."

Page 76, paragraph 4.5.6.3.2.2.2: In line 2, delete "+5°C." and substitute "+5°C." and in items (e) and (g), line 2, after "+2°C.", add "for 4 hours".

Page 79, paragraph 4.5.6.3.5: Add "During these tests, the calibration cell shall be kept outside of the environmental test chamber except for the time it is being used in accordance with 4.5.6.3.1."

Page 81, paragraph 4.5.6.3.7: Delete and substitute:

"4.5.6.3.7 Post environmental tests.- The specific operating test of 4.5.3.2 and the specific production control test of 4.5.4.4 shall be repeated after all of the environmental tests of 4.5.6.3.2 through 4.5.6.3.6 being performed on a given unit have been performed. Any unit failing to conform to the requirements of 4.5.3.2 and 4.5.4.4 shall be counted as failing to pass the environmental test and shall be rejected."

Page 83, paragraph 6.1(c): Delete "filing" and substitute "filling".

- # Page 83, paragraph 6.2, line 4: Delete "whthere" and substitute "whether".
- # Page 86, figure 3: Delete and substitute the attached figure 3.
- # Page 94: Add figure 7:

"MX-4713()/USM-118A CALIBRATION CELL METER TEST
INSTRUCTIONS

1. Insert card 6 Fixed Bias Cal. Neg. Press button #2. Adjust meter to read 50 with "Bias Cal Neg control. Remove card 6.
2. Insert Card 1C, ZENER CALIB UA. Plug the Zener Calibration Cell into the octal test socket. Push button #2. The meter shall read within + division of the figure written on the top blank of the calibration cell cover. If reading is out of tolerance, the meter should be checked against a meter standard for 50 ua indication at 50 on the 0-100 meter scale. Remove card 1C.
3. Insert Card 1D, ZENER CALIB MV. Press outton #2. The meter shall read within +1 division of the figure written in the bottom blank on the calibration cell cover. If reading is out of tolerance adjust the "Meter Cal" control for the proper reading. Remove card 1D.
4. Continue with cards 2 through 5, supplied with tester, using the Zener cell.

Figure 7 - MX-4713()/USM-118A
Calibration cell meter test instructions."

Page 95, Appendix I, title: Delete and substitute "Electron Tube Test Cards Included in AN/USM-118()."

Page 101, Appendix II, title: Delete and substitute "Electron tube Test Cards Included in Card Kit MK-704()/USM-118A."

Page 102, Appendix II, line 2: Delete "OG3/85A3" and "OG3/85A2".

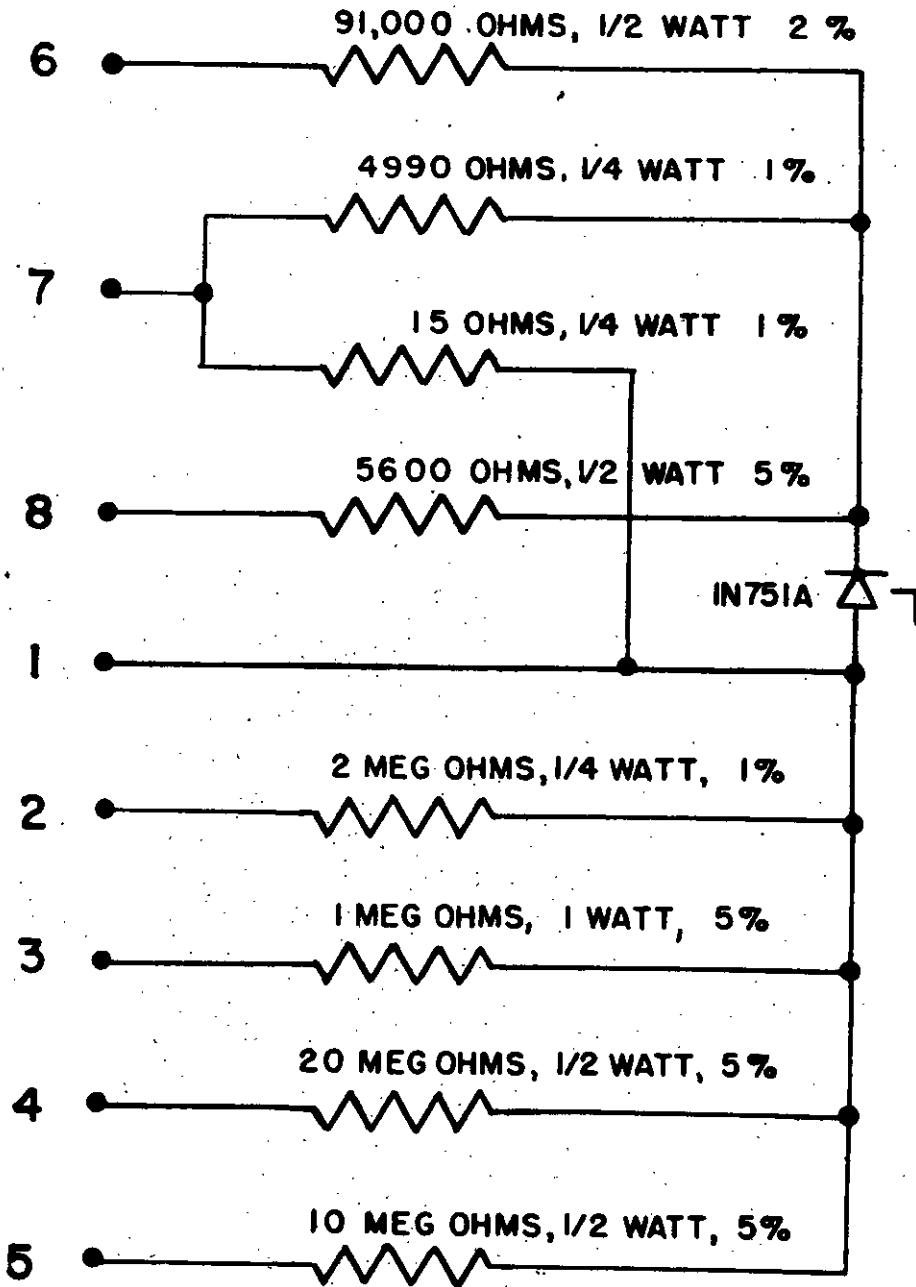
Page 108, Appendix II, tube type 6A8, card column, add "2 of 2" after "1 of 2".

Page 137, Appendix III, title: Delete and substitute "Electron Tube Test Cards Included in Card Set MK-827()/USM-118A."

Page 223, Appendix IV, title: Delete and substitute "Electron Tube Test Cards Included in Card Set MK-828/USM-118A."

Preparing activity:
Navy - SH
(Project 6624-N406Sh)

OCTAL PLUG
PIN NUMBER



SH 6014A