

MILITARY SPECIFICATION SHEET

ELECTRON TUBE, RECEIVING

TYPE OA2WA

The complete requirements for procuring the electron tube described herein shall consist of this document and the latest issue of Specification MIL-E-1.

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

DESCRIPTION: Voltage regulator, miniature

Outline --- 5-3 (EIA)
 Base --- E7-1
 Envelope --- T5-1 2
 Cathode --- Glow discharge

Base connections:

Pin No.	---	1	2	3	4	5	6	7
Element	---	a	k	int con	k	a	int con	k

ABSOLUTE-MAXIMUM RATINGS:

	Ⓚ	Ⓚ					Ⓚ
Parameter:	Total darkness ionization voltage	Ambient light ionization voltage	Operating voltage	Operating current	TA	TF	Alt
Unit:	Vdc	Vdc	Vdc	mAdc	C	°C	ft
Maximum:	165	165	158	30	---	150	Note 7
Minimum:	---	---	140	5	-55	---	---

TEST CONDITIONS: --- --- --- --- --- --- ---

GENERAL:

Qualification - Required
 Reliable tube

Ⓚ denotes changes

OA2WA

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL OR CODE	SYMBOL	LIMITS		UNIT
						MIN	MAX	
1031	<u>Qualification inspection</u> Variable-frequency vibration	Rp = 10,000 ohms; Ebb/Db = 20 mAdc	---	---	Ep	---	100	mVac
3347	<u>Quality conformance inspection, part 1 (see note 1)</u> Ionization voltage (1)	Ebb/Db = 5-30 mAdc; Illumination = 5 to 50 ft candles (see note 2)	0.4	II	Ez	---	165	Vdc
3337	Voltage drop (1)	Ebb/Db = 30 mAdc	0.4	II	Etd	144	153	Vdc
3337	Voltage drop (2)	Ebb/Db = 5 mAdc	0.4	II	Etd	144	153	Vdc
3335	Regulation	(1)Etd minus (2)Etd	0.4	II	Reg	---	±5	Vdc
1201	Short and discontinuity detection		0.4	II	---	---	---	---
3278	<u>Quality conformance inspection, part 2 (see note 1)</u> Noise	Ebb/Db = 30 mAdc	1.0	I	Eb	---	5	mVac
3278	Oscillation	Estg = 100 mVac; Ebb/Db = 5-30 mAdc	1.0	I	---	---	---	---
---	Voltage jump	Ebb/Db = 5-30 mAdc (see note 3)	2.5	Code G	Jump	---	600	mVdc
3347	Ionization voltage (2)	See note 4	2.5	Code G	Ez	---	165	Vdc
3305	Leakage	Eb = 50 Vdc; Rp = 3,000 ohms	2.5	Code G	Llb	---	5	μAdc
3337	Voltage drop (3)	Ebb/Db = 20 mAdc	2.5	Code G	Etd	144	153	Vdc
---	Repeatability	Ebb/Db = 10 mAdc (see note 5)	2.5	Code G	Etd	---	600	mVdc
1031	Low-frequency vibration	Rp = 10,000 ohms; Ebb/Db = 20 mAdc	2.5	Code G	Ep	---	100	mVac
1041	Shock	900 G	---	---	---	---	---	---
1031	Vibration-fatigue test	2.5 G; fixed frequency; F = 25 min, 60 max	2.5	See note 6	---	---	---	---
---	Post-shock and vibration- fatigue test end points	Low-frequency vibration Ionization voltage (1) Voltage drop (1) Voltage drop (2) Regulation	---	---	Ep Ez Etd Etd Reg	---	100 165 155 142 155 ±5	mVac Vdc Vdc Vdc Vdc
1121	Base strain		---	---	---	---	---	---
2126	Glass strain		2.5	I	---	---	---	---
1105	Permanence of marking		---	---	---	---	---	---

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL PERCENT DEFECTIVE	MSP LEVEL OR CODE	ALLOWABLE DEFECTIVES PER CHARACTERISTIC		SYMBOL	LIMITS		UNIT
					1ST SAMPLE	COMBINED SAMPLES		MIN	MAX	
	<u>Quality conformance inspection, part 3</u>									
1518	Stability life test	Ebb/Eb = 20 mAdc; TA = room	---	---	---	---	---	---	---	---
---	Stability life-test end point	Change in voltage drop (3) of individual tubes (see note 9)	---	---	---	---	ΔEtd t	---	2.0	Vdc
1521	Survival-rate life test	Stability life-test, or equivalent conditions	---	---	---	---	---	---	---	---
---	Survival-rate life-test end points	Short and discontinuity detection Change in voltage drop (3) of individual tubes	---	---	---	---	ΔEtd t	---	5.0	Vdc
---	Life test	Stability life-test, or equivalent conditions TE = 150°C (min) (see note 8)	---	---	---	---	---	---	---	---
---	Life-test end points (500 hours)	Inoperatives Regulation Voltage drop (1) Voltage drop (2) Voltage drop (3) Change in voltage drop (3) of individual tubes Ionization voltage (1) Total defectives	---	---	1 1 1 1 1 1 1 4	3 3 3 3 3 3 3 8	Reg Etd Etd Etd Etd Ez ---	---	16 142 142 142 6 165 ---	Vdc Vdc Vdc Vdc Vdc Vdc ---
---	Life-test end points (1,000 hours)	Inoperatives Regulation Voltage drop (1) Voltage drop (2) Voltage drop (3) Change in voltage drop (3) of individual tubes Ionization voltage (1) Total defectives	---	---	2 2 2 2 2 2 2 5	5 5 5 5 5 5 5 10	Reg Etd Etd Etd Etd Ez ---	---	18 140 140 140 8 165 ---	Vdc Vdc Vdc Vdc Vdc Vdc ---

NOTES:

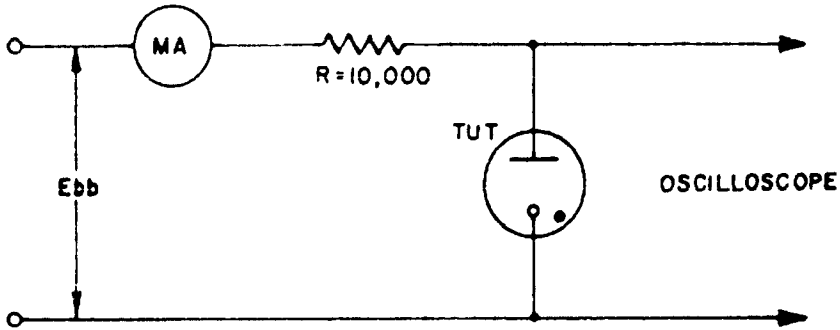
- ① 1. Sampling procedure shall be in accordance with MIL-STD-105 with sample size determined by lot size, except the minimum sample size shall be as specified below. Use the AQL and inspection level specified for each individual test item to determine the minimum sample size code letter. The maximum lot tolerance percent defectives (LTPD), specified below, are for information purposes and are defined as the percent defective in the lot for which the probability of acceptance is 0.10 as obtained from the operating characteristic curves in MIL-STD-105.

AQL (percent defective)	Inspection level	Maximum LTPD	Minimum sample size code
0.4	II	2.7	L
1.0	I	6.5	H
2.5	I	12.9	H
6.5	S3	27.1	G

2. This test to be performed at the conclusion of the holding period.

NOTES: -Continued

3. Vary current from 5 mA_{dc} to 30 mA_{dc} and back to 5 mA_{dc} (by adjusting Ebb slowly). Sudden jumps registered on the oscilloscope shall be not greater than the specified value.



4. Conditions for this test shall be those of ionization voltage (1), except testing shall be done in total darkness and the tube shall not have conducted or been exposed to light for at least 24 hours prior to testing. The tube shall fire within 20 seconds maximum.
5. The tube shall be tested in the following manner:
- The voltage drop shall be read at 10 mA_{dc} drain.
 - The tube shall be turned off for 1 minute.
 - The tube shall be restarted and operated at the same current.
 - Etd shall be read after 1 minute of operation.
 - The "on-off" cycle shall be repeated a minimum of five times. The maximum difference in tube voltage drop shall be taken as the measure of repeatability.
- Ⓓ 6. This test shall be conducted on the initial lot and thereafter on a lot approximately every 6 months. When one lot has passed, the 6-month rule shall apply. In the event of lot failure, the lot shall be rejected and the succeeding lots shall be subjected to this test until a lot passes. MIL-STD-105, sample size code letter E, shall apply.
7. See "Reduced pressure (altitude) rating", and altitude, maximum peak voltage.
- Ⓓ 8. Envelope temperature (TE) requirements, when measured in accordance with the temperature by conduction-band measurement (method 1226), will be satisfied if a tube having bogey tube drop (Etd \pm 3 percent) under normal test conditions, is determined to operate at or above minimum specified temperature at any position in the life-test rack.
- Ⓓ 9. Duration shall be 1 hour.

Custodians:

Army - EL
Navy - EC
Air Force - 80

Preparing activity: Navy - EC

Agent: DSA - ES

(Project 5960-2488)

Review activities:

Army - MU
Air Force - 11, 17
DSA - ES

User activities:

Army - WC
Navy - AS, MC, CG, SH
Air Force - 19