

NOTES (Contd.)

- B. For greater reliability the operating bulb temperature should be maintained as constant as possible and the higher temperatures should be avoided.
- C. For Reference Tube applications the recommended operating current is between 1 to 2 mA.
- D. For the valve to strike either in total darkness or in normal ambient light.
- E. The maximum peak acceleration under continuous random vibration conditions specified assumes that the vibration frequency components are varying continuously over the band 10 to 1,000 cycles/sec. in the random manner.
- F. The maximum peak acceleration under short term random vibration conditions specified assumes that the vibration frequency components are varying continuously over the band 10 to 1,000 cycles/sec. in a random manner.
- G. In order that the valve shall maintain its Reference Voltage during prolonged storage, the maximum Ambient Storage Temperature should not exceed normal room temperatures. The minimum Ambient Storage Temperature is -60°C. Detailed information to be inserted later.
- H. The temperatures quoted are bulb temperatures, which are defined as the highest temperature indicated when using a calibrated thermocouple of No. 40 B.C. or smaller diameter elements, welded to a ring, made of 0.025 inches diameter bronze wire, in contact with the valve envelope midway between the shoulder and base.
- J. Direct soldered connections to the leads must be at least 5 mm. from the seal and any bending of the leads must be at least 1.5 mm. from the seal.

Superceded

TESTS

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TO BE PERFORMED IN ADDITION TO THOSE APPLICABLE IN K.1001

TESTS IN ANY ONE GROUP SHALL BE PERFORMED IN THE SPECIFIED ORDER

TEST CONDITIONS - UNLESS OTHERWISE SPECIFIED												
		Va(b)(V)	Ra(Ohms)	Tamb.(°C)								
		125	27,000 ± 5%	15 to 30								
		(Note: 1)										
K1001	TEST	TEST CONDITIONS	AQL %	INSP. LEVEL	SYMBOL	LIMITS						UNITS
						MIN.	LAL	BOGEY	UAL	MAX.	ALD	
AVI/5.6	<u>GROUP A</u>											
	Visual Inspection	Notes: 2, 3		100%								
	Inoperatives			100%								
	Insulation	Va-k = 50V		100%	R	50	-	-	-	-	-	Mohms
	Striking Time (1)	Note: 4		100%	t	-	-	-	-	0.5	-	Secs.
	Vibration Noise (1)	Acceleration = 20g peak min. Frequency = 50 c/s Notes: 3, 5		100%	Va(AC)	-	-	-	-	25	-	mV p.p.
	<u>GROUP B</u>	Note: 6										
	Striking Time (2)	Note: 4	0.4	II V2	t	-	-	-	-	0.5	-	Secs.
					t	To be recorded and agreed later.						Secs.
	Reference Voltage (1)		0.4	II V2	Va	83	-	85	-	87	-	V
					Va	To be recorded and agreed later.						V
	Reference Voltage (2) Ia = 5mA		0.4	II V2	Va	-	-	-	-	90.5	-	V
				Va	To be recorded and agreed later.							
	Regulation (1)	Ia changed from 1 to 2mA Ra = 5,000 min.	0.4	II V2	Δ Va	-	-	-	-	1	-	V
				V2	Δ Va	To be recorded and agreed later.						
	Voltage Jumps (1)	Ia varied from 1 to 5mA Notes: 7, 8	0.4	II		-	-	-	-	8	-	mV
	<u>GROUP C</u>											
	Voltage Jumps (2)	Ia varied from 0.5 to 1mA Notes: 7, 8, 9	2.5	I		-	-	-	-	50	-	mV
	Regulation (2)	Ia changed from 0.5 to 5mA	1.0	I	Δ Va	-	-	-	-	4.5	-	V
	<u>GROUP D</u>											
	Oscillation	Ia varied from 1 to 5mA Ra = 5,000 Note: 7	4.0	T/A	Va(AC)	-	-	-	-	2	-	mV p.p.
	Temperature Coefficient (1)	T bulb Range +25 to +85°C Notes: 10, 11	2.5	IA		0	-	-	-	7	-	mV/°C
	Temperature Coefficient (2)	T bulb Range -60 to +25°C Notes: 10, 11		T/A		0	-	-	-	10	-	mV/°C
	Operation at Reduced Temperature	T bulb = -60°C max. Notes: 10, 12		T/A								
	Operation at Elevated Temperature	T bulb = 85°C min. Notes: 10, 12		T/A								
	Low Pressure Voltage Breakdown	Pressure = 55 ± 5mm. Hg. Temperature 25 ± 5°C Relative Humidity = 0 Note: 13		T/A								

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K1001	TEST	TEST CONDITIONS	AQL %	INSP. LEVEL	SYMBOL	LIMITS						UNITS
						MIN.	LAL	BOGEY	UAL	MAX.	ALD	
	<u>GROUP E</u>											
AIX/2.4.2.3 2.4.2.3	Lead Fragility	No voltages	1.0	IA								
AIX/2.4.2.6 2.4.2.6	Glass Strain	No voltages, Note 14	2.5	IA								
	Vibration Noise (2)	Notes: 5, 14		V3	Va(AC)	-	-	-	10	-	-	mV p.p.
AIX/2.4.2.5 2.4.2.5	Vibration Fatigue	Acceleration = 5g peak min. Time = 200 hours Note: 15		II								
	Vibration Noise (3)	Note: 16 Acceleration = 20g peak min. Frequency = (1) 60 - 120 o/s (2) 120 - 250 o/s (3) 250 - 500 o/s (4) 500 - 1000 o/s (5) 1000 - 2000 o/s			Va(AC)	-	-	-	-	50	-	mV p.p.
					Va(AC)	-	-	-	-	50	-	mV p.p.
					Va(AC)	-	-	-	-	50	-	mV p.p.
					Va(AC)	-	-	-	-	50	-	mV p.p.
					Va(AC)	-	-	-	-	50	-	mV p.p.
	<u>Post Vibration Noise (3) Tests</u>	Combined AQL	2.5									
	Striking Time (1)	Note: 4	0.4	t		-	-	-	-	0.5	-	Secs.
	Change in Reference Voltage (1)		1.0	ΔVa		-	-	-	-	0.8	-	V
	Regulation (1)	As in Group B	1.5	ΔVa		-	-	-	-	1	-	V
	Vibration Noise (1)	As in Group A Note: 5	0.4	Va(AC)		-	-	-	-	50	-	mV p.p.
	Catastrophics	Note: 17	0.4									
AIX/2.4.2.4 2.4.2.4	Shock	Hammer Angle = 30° No Voltages		T/A								
	<u>Post Shock Tests</u>	As for Post Vibration Noise (3) Tests		T/A								
	<u>GROUP F</u>											
AIX/2.4.2.5 2.4.2.5	Life											
AVI/5.1	<u>Stability Life</u>											
	Change in Reference Voltage (1)		1.0	I	ΔVa	-	-	-	-	0.2	-	V
AVI/5.3	<u>Intermittent Life</u>											
AVI/5.6	<u>Test Point 500 hours</u>	Combined AQL	2.5	Code G								
	Inoperatives											
	Striking Time (1)	Note: 4		t		-	-	-	-	0.5	-	Secs.
	Change in Reference Voltage (1)			ΔVa		-	-	-	-	0.4	-	V
	Regulation (1)	As in Group B		ΔVa		-	-	-	-	1	-	V

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K1001	TEST	TEST CONDITIONS	AQL %	INSP. LEVEL	SYMBOL	LIMITS						UNITS
						MIN.	LAL	BOGEY	UAL	MAX.	ALD	
AVI/5.6	GROUP F (Contd.)											
	Intermittent Life (Contd.)											
	Test Point 1000 hours	Combined AQL	4.0	Code G								
	Inoperatives											
	Striking Time (1)	Note: 4			t	-	-	-	-	0.5	-	Secs.
	Change in Reference Voltage (1)				ΔV_a	-	-	-	-	0.5	-	V
	Regulation (1)	As in Group B			ΔV_a	-	-	-	-	1	-	V
ADX/2.5	GROUP G											
	Electrical Re-Test after 28 days holding period			100%								
AVI/5.6	Inoperatives		0.5									
	Striking Time (2)	Note: 4			t	-	-	-	-	0.5	-	Secs.
	Reference Voltage (1)				V _a	83	-	-	-	87	-	V
	Regulation (1)	As in Group B			ΔV_a	-	-	-	-	1	-	V

NOTES

- This voltage is for a nominal current of 1.5 mA and shall be suitably adjusted for other current conditions where specified.
- The valve shall be visually inspected for good workmanship. Standards to be defined and agreed later.
- This test may be done alternatively in Group G.
- A direct voltage of 125 Volts shall be applied between the Anode and Cathode in such a manner that this value is never exceeded. The tube shall ignite within 0.5 secs. of the application of voltage. For Striking Time (1) the test shall be carried out in normal ambient lighting, whilst for Striking Time (2) the test shall be conducted with the valve in total darkness, after it has been held in total darkness for at least 24 hours.
- The valve shall be mounted so that the direction of vibration is perpendicular to the axis of the valve. The test shall be of sufficient duration to obtain a steady reading of noise.
- At this stage the lot shall be formed. It shall be an identifiable lot not exceeding 300 valves. Normal sampling (single) shall apply.
- Measuring equipment to have a substantially linear frequency response over the range 20 to 50,000 c/s.
- A calibrated indicator as specified in Note 7 is to be connected between Anode and Cathode. The Anode current is to be varied through the full-rated current range in 5 ± 1 Secs. Where an indicator with persistence of less than 1 second is used, this test shall be performed at least 3 times, but if an indicator with persistence of 1 second or more is used, one sweep is sufficient.
- Record reading for checking limit. Not to be an acceptance test at present.
- The bulb temperature is defined as the highest temperature indicated when using a calibrated thermocouple of No.40 B.S. or smaller diameter elements, welded to a ring made of 0.025 inches diameter phosphor bronze wire, in contact with the valve envelope midway between the shoulder and base.

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NOTES (Contd.)

11. The valve with the thermocouple attached and operating under the conditions specified shall be immersed in an oil bath with the bulb temperature stabilized at (a) $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, (b) $+85^{\circ}\text{C}$ min., (c) -60°C max. The valve shall be maintained at each of these temperatures for a minimum period of 5 minutes after which the bulb temperature and Reference Voltage shall be recorded. The Temperature Co-efficients shall be calculated by dividing each of the measured temperature ranges into the corresponding change of Reference Voltage.
12. The valve with the thermocouple attached shall be immersed in an oil bath maintained at such a temperature that the bulb temperature stabilizes at the stated temperature. Between 10 and 15 minutes after immersion, the tests specified below shall be performed:

- (i) Striking Time (1)
- (ii) Reference Voltage (1)
- (iii) Regulation (1)
- (iv) Voltage Jumps (1)

The test limits for Reference Voltage (1) shall be 82.5V min. to 87V max. at 85°C and shall be 83V min. to 88V max. at -60°C . The limits for the other tests shall be identical to those applicable at room temperature.

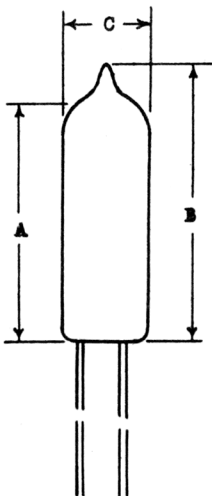
13. Va(b) shall be increased from 100 Volts to the potential at which the valve strikes, during which time there shall be no evidence of corona or arcing. The rate of increase of potential shall not be greater than 2 Volts/sec.
14. Test conditions as for Vibration Noise (1) in Group A. Record readings for checking UAL limit. Not to be an acceptance test at present.
15. The sample shall be vibrated over the frequency range 60 to 500 c.p.s., 100 hours with the axis of each valve parallel to the direction of vibration, and 100 hours with the axis of each valve perpendicular to the direction of vibration. The rate of change of frequency, in each direction, shall not be greater than 1 octave per 5 minutes.
16. This test to be applied to the total sample previously subjected to the Vibration Fatigue test. Each valve shall be mounted so that the direction of vibration is perpendicular to the axis of the valve and shall be vibrated over the frequency range 60 to 2,000 c.p.s. swept once only at a rate of change of frequency not greater than 1 octave per 30 seconds. In addition record, to Inspection Level I, the maximum vibration output in each of the specified frequency bands for checking limits. Not to be an acceptance test at present.
17. A valve shall be deemed to be catastrophic if it is either an inoperative as defined in K1001 App.VI/5.6 or has one or both of the following defects:-
 - (i) ^{Reference} Reflector Voltage (1) outside the limits $\pm 10\%$ of the bogey given in Group B.
 - (ii) Vibration noise output, as measured in Group A, greater than 250 mV p.p.

18. Valves used for this test will not be acceptable for delivery.

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The valve shall conform to either of the following:-

Outline:



Base:

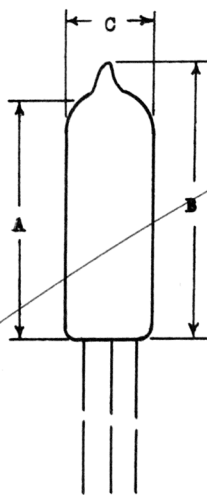


See B.S.448/B8D/F/1.1

Connections:

Lead	Electrode	
1	Cathode	k
2	Lead omitted	
3	Anode	a
4	Lead omitted	
5	Lead omitted	
6	Cathode	k
7	Lead omitted	
8	Anode	a

Outline:



Base:



Leads to be of tinned flexible wire
0.45 mm. dia. nom. and spaced 2.44 mm.
nom. between centres.

Connections:

Lead	Electrode	
1	Cathode	k
2	Lead omitted	
3	Anode	a
4	Lead omitted	
5	Cathode	k

SPECIFICATION MOS/CV4516

ISSUE 1, DATED 1st. DECEMBER, 1958

AMENDMENT No. 1

Page 1

PROTOTYPE

Delete "VX8190C", insert "VX8253C".

Page 3

GROUP D

Oscillation Delete "1.0" in the AQL column.

Page 4

GROUP E

Lead Fragility Delete "AIX/2.4.7" in K.1001 column and insert "AIX/2.4.2.3".

Glass Strain Delete "AIX/2.4.6" in K.1001 column and insert "AIX/2.4.2.1".

Add "Note 18" in the Test Conditions column.

N.54926/D

/Vibration Fatigue

Vibration Fatigue Delete "AIX/2.4.3" in K.1001 column and insert "AIX/2.4.2.4.2".

Shock Delete "AIX/2.4.4" in K.1001 column and insert "AIX/2.4.2.4.3".

GROUP F

Life Delete "AIX/2.4.5" in K.1001 column and insert "AIX/2.4.3".

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NOTE 17(i) Amend "Reflector Voltage (1)" to read "Reference Voltage (1)".

Following Note 17 add:-

NOTE 18. Valves used for this test will not be accepted for delivery.

May, 1959.

DLRD(T) (T.L.9)

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