

SPECIFICATION: MOS/CV.4510 Issue No. 1 Dated 15.7.58 To be read in conjunction with K.1001, BS.448 and BS.1409.	<u>SECURITY</u>	
	<u>SPECIFICATION</u> Unclassified	<u>VALVE</u> Unclassified

TYPE OF VALVE:- Reliable Micro-Miniature Triode with Flying Leads. CATHODE:- Directly Heated. ENVELOPE:- Metal Case. PROTOTYPE:- F3A2.	<u>MARKING</u> See K.1001/4 CV. No., T.A. Letters Factory and Date Code only required.
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<u>RATINGS</u> (All limiting ratings are absolute.)	<u>BASE</u> See drawing on page 6, Fig.1.
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Filament Voltage (V) 0.9 Filament Current (mA) 90 Max. Anode Voltage (Ia = 0) (V) 250 Max. Anode Dissipation (25°C) (mW) 200 Max. Anode Dissipation (150°C) (mW) 150 Max. Anode Temperature (°C) 150 Max. Acceleration (Continuous Operation) (g) 20 Max. Shock (short duration) (g) 500	<u>NOTES</u>	<u>CONNECTIONS</u>											
	B B	<table border="1"> <thead> <tr> <th>Lead No.</th> <th>Electrode</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Grid g</td> </tr> <tr> <td>2</td> <td>Filament f</td> </tr> <tr> <td>3</td> <td>Filament f</td> </tr> <tr> <td>4</td> <td>Grid g</td> </tr> <tr> <td>Case</td> <td>Anode a</td> </tr> </tbody> </table> NOTE A	Lead No.	Electrode	1	Grid g	2	Filament f	3	Filament f	4	Grid g	Case
Lead No.	Electrode												
1	Grid g												
2	Filament f												
3	Filament f												
4	Grid g												
Case	Anode a												

<u>TYPICAL OPERATING CONDITIONS</u>	<u>DIMENSIONS</u> See drawing on page 6, Fig.1.
Anode Voltage (V) 160 Negative Grid Voltage (V) 0.5 Mutual Conductance (mA/V) 0.4 Anode Impedance (KΩ) 110	<u>MOUNTING POSITION</u> Any.

<u>CAPACITANCES (pF)</u>	
Cag (nom.) 1.75 Caf (nom.) 0.7 Cfg (nom.) 0.5	

<u>NOTES</u>
A. Soldered connection to be made to top of can only.
B. To achieve this dissipation the valve requires to be run into grid current when changes in contact potential may occur.

CV.4510

TESTS

To be performed in addition to those applicable in K.1001.

The tests shall be performed in the specified order unless otherwise agreed with the Inspecting Authority.

TEST CONDITIONS:- Unless otherwise specified.

$V_f = 0.9V.$

$V_a = 150V.$

$V_g = -0.5V$

K.1001 REF.	TEST	TEST CONDITIONS	AQL %	INSP LEVEL	SYM- BOL	LIMITS					UNITS	
						MIN.	LAL	BOGEY	TAL	MAX.		ALD
11.1	<u>GROUP A</u>											
	Visual Inspection	No voltages Notes 1, 2.	-	100%	-	-	-	-	-	-	-	-
	Inoperatives		-	100%	-	-	-	-	-	-	-	-
	Electrode Insulation	V_a -all = -500V. V_g -all = -100V.	-	100%	R	10000	-	-	-	-	-	MΩ
	Reverse Grid Current (1)	$R_g = 500KΩ$ max.	-	100%	-I _{g1}	-	-	-	-	0.05	-	μA
Vibration Noise (1)	Acceleration = 20g min. Frequency = 70 cps to 3kps. $V_a(b) = 150V.$ $R_L = 27KΩ$ $V_g = 0$ $R_g = 500Ω$ Note 3.	-	100%	V_g (AC)	-	-	-	-	50	-	μV peak	
	Voltage Gain	$V_a(b) = 150V$ $R_L = 270KΩ$ $R_g = 1MΩ$ Note 4.	-	100%		27	-	28.5	-	30	-	db
	<u>GROUP B</u>											
	Filament Current		0.4	II	I _f	85	-	90	-	95	-	mA
	Anode Current (1)		0.4	II	I _a	500	-	700	-	900	-	μA
				V2	I _a	To be recorded and agreed later					μA	
	Mutual Conductance		0.4	II	gm	300	-	400	-	500	-	μA/V
				V2	gm	To be recorded and agreed later.					μA/V	
	<u>GROUP C</u>											
5.12	Anode Current (2)	$V_g = -3.5V.$	2.5	I	I _a (tail)	-	-	-	-	50	-	μA
	Lead Fragility	No voltages	2.5	I	-	-	-	-	-	-	-	-
	Change of Mutual Conductance	$V_f = 0.8V.$ Note 8.	2.5	I	Δgm	-	-	-	-	15	-	%
	Reverse Grid Current (2)	$V_f = 1.0V.$ Adjust V_g for $I_a = 1.0$ mA. Notes 8 and 9.	2.5	I	-I _{g1}	-	-	-	-	0.1	-	μA

K.1001 REF.	TEST	TEST CONDITIONS	AQL %	INSP LEVEL	SYM- BOL	LIMITS						UNITS	
						MIN.	LAL	BOGEY	UAL	MAX.	AID		
11.3	<u>GROUP E</u>												
	Fatigue	Vf = 0.9V. Min. Acceleration = 20g. Freq. = 170 cps Duration = 100 hours. Note 5.	-	I	-	-	-	-	-	-	-	-	
	<u>POST FATIGUE TESTS</u>	Combined AQL = 2.5%											
	Reverse Grid Current (1)	As in Group A.	1.0	-	-I _{g1}	-	-	-	-	0.05	-	μA	
	Mutual Conductance		1.0	-	gm	300	-	400	-	500	-	μA/V	
	Vibration Noise	As in Group A.	1.0	-	Vg (AC)	-	-	-	-	50	-	μV peak	
	<u>SHOCK</u>	Min. deceleration = 5000g. No voltages. Note 10.	-	I	-	-	-	-	-	-	-	-	
	<u>POST SHOCK TESTS</u>	Combined AQL = 2.5%											
	Reverse Grid Current (1)	As in Group A.	1.0	-	-I _{g1}	-	-	-	-	0.05	-	μA	
	Mutual Conductance		1.0	-	gm	300	-	400	-	500	-	μA/V	
11.1	Vibration Noise	As in Group A.	1.0	-	Vg (AC)	-	-	-	50	-	μV rms		
AVI/ 5	<u>GROUP F</u>												
	Life	Note 6.											
	5.1	<u>Stability Life</u> Change in Mutual Conductance	(1 hour)	1.0	I	Δgm	-	-	-	10	-	%	
	5.3	<u>Intermittent Life</u> Test Point 500 hours.	Combined AQL	4.0	IA								
	5.6	Inoperatives Filament Current		2.5	-	-	-	-	-	-	-	-	
		Reverse Grid Current (1)	As in Group A.	2.5	-	I _f -I _{g1}	85	-	90	-	95	-	mA μA
		Mutual Conductance		2.5	-	gm	260	-	-	-	500	-	μA/V
		Average Change of Mutual Conductance		2.5	-	Δgm	-	-	-	15	-	%	
		Electrode Insulation	Va-all = -500V. Vg-all = -100V.	2.5	-	R R	10000 10000	-	-	-	-	-	MΩ MΩ

K.1001 REF.	TEST	TEST CONDITIONS	AQL %	INSP LEVEL	SYM- BOL	LIMITS					UNITS
						MIN.	LAL	BOGEY	UAL	MAX.	
	<u>GROUP F (contd.)</u>										
	Test Point 1000 hours. Combined AQL		6.5	IA							
AVI/ 5.6	Inoperatives Filament Current Reverse Grid Current (1)	As in Group A.	4.0	-	-	-	-	-	-	-	-
	Mutual Conductance		4.0	-	gm	240	-	-	-	500	-
	Electrode Insulation	Va-all = -500V. Vg-all = -100V.	4.0	-	R	10000	-	-	-	-	MΩ
			-	-	R	10000	-	-	-	-	MΩ
	<u>GROUP G</u>										
AVI/ 2.5	Electrical Retest after 28 days holding period.			100%	-	-	-	-	-	-	-
AVI/ 5.6	Inoperatives Reverse Grid Current (1)	As in Group A.	0.5	-	-	-	-	-	-	-	-
			0.5	-	-Ig1	-	-	-	0.05	-	μA
	<u>GROUP H</u>										
AIII	Capacitances	Measured on a 1Mc/s bridge. Valve mounted in an approved fully shielded socket. Note 7.	T.A.	Cag Cef Cfg	1.6 0.66 0.47	- - -	1.75 0.7 0.5	- - -	1.9 0.74 0.54	- - -	pF pF pF

NOTES

1. The valve shall be visibly inspected for good workmanship.
2. This test may be carried out in Group C.
3. The valve shall be mounted so that the direction of vibration is parallel to its minor axis. The test shall be of sufficient duration to obtain a steady reading of noise output.
4. A typical circuit for the measurement of voltage gain is shown on page 6, Fig.2.
5. The valves shall be vibrated in each of the three required planes for a total period of not less than 100 hours (30 + 39 + 30). Filament switched 1 minute on, three minutes off. No other voltages applied.

NOTES
(contd.)

6. The Life Test conditions are : -

The Life Tests to be carried out in an Ambient Temperature of 150°C and
Vg = -1.5V. Va adj. for Wa = 100mW. (Ia = 0.6mA approx.)

7. Capacitance connections to be made as follows:

TEST	NP	LP	E
Cag	Can	1, 4	2, 3
CaF	Can	2, 3	1, 4
Cfg	2, 3	1, 4	Can

8. Prior to this test the valve shall be pre-heated for not less than five minutes under the test conditions.
9. Grid current shall not be rising or out of limit after a total time of ten minutes (including pre-heating time).
10. This test to be carried out using a lead block decelerator. Direction of shock to be applied along the longitudinal axis.

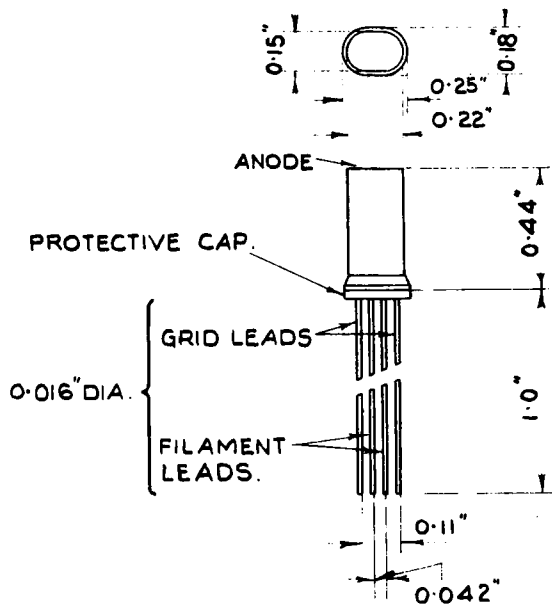


FIG. 1. OUTLINE DRAWING.

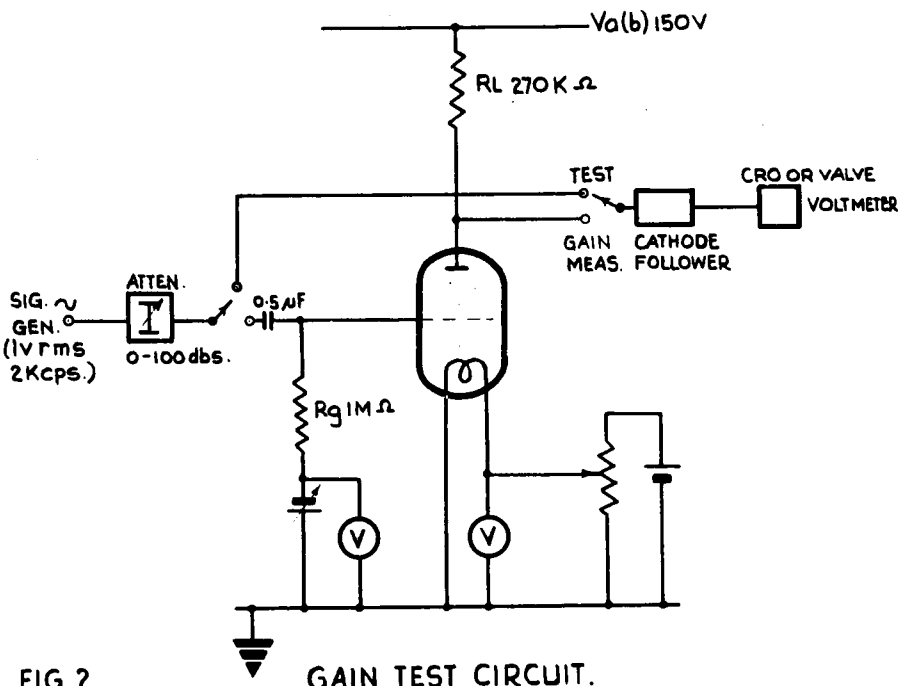


FIG. 2. GAIN TEST CIRCUIT.