

Specification MOA/CV.4106		<u>SECURITY</u>	
Issue No.1.	Dated 1.12.60.	<u>Specification</u>	<u>Valve</u>
To be read in conjunction with K1001, BS448 and BS1409		Unclassified	Unclassified

TYPE OF VALVE:- Reliable Pulse Tetrode		<u>MARKING</u>	
CATHODE:- Indirectly Heated		See K1001/4	
ENVELOPE:- Glass (parallel sided)		<u>BASE</u>	
PROTOTYPE:- VX3524(similar to CV2659 (3D21A))		BS448/BS-0	
<u>RATINGS</u> (All limiting values are absolute)		<u>CONNECTIONS</u>	
		<u>Notes</u>	
Heater Voltage	(V) 6.3	B	
Heater Current	(A) 1.3	B	
Heater Voltage	(V) 12.6	C	
Heater Current	(A) 0.65	C	
Max. Anode Voltage (D.C)	(kV) 4.0	D,E	
Max. Anode Voltage (Pulse)	(kV) 5.0		
Max. Anode Dissipation	(W) 15		
Max. Screen Voltage (D.C)	(V) 850	E	
Max. Screen Dissipation	(W) 3.5		
Max. Grid Voltage (positive and negative)	(V) 220		
Max. Grid Dissipation	(W) 0.5		
Max. Cathode Current (D.C)	(mA) 150		
Max. Cathode Current (pulse)	(A) 10		
Max. Anode Current (Pulse)	(A) 7.5		
Max. Peak Heater Cathode Voltage	(V) ± 150		
Max. Pulse Length	(µsecs) 10	F	
Min. Heating Time	(secs) 45		
Max. Bulb Temperature	(°C) 240	G	
Inner Amplification Factor(µg1/g2)	9.5		
Max. Shock (Short duration)	(g) 500		
Max. Acceleration (Continuous)	(g) 2.5		
<u>GAPACITANCES (pF)</u> <u>NOTE H</u>		<u>DIMENSIONS</u> See K1001/A1/D1	
C in (nom)	14.5	Dimensions mm.    Min.    Max.	
C out (nom)	12.0	"A" Overall length    -    100	
Cag 1.(max)	1.55	"B" Diameter    -    34	
		"L" Seated height    -    85	
		<u>TOP CAP</u> BS448/CT1.	
		<u>MOUNTING</u> Any	
<u>NOTES</u>			
A. <u>WARNING</u> If a base retaining device is used, the clamp must be insulated when the potential is other than earth.			
B. Heaters parallel connected.			
C. Heaters series connected.			
D. With maximum screen voltage of 400 V and when no transients are present (essentially resistive anode load) maximum D.C. anode voltage of 4.5kV D.C. may be applied.			

NOTES (Cont'd)

- E. A series resistance must be inserted in the power supply to limit the D.C. short circuit current to less than 0.5A.
- F. Total pulse length in any 240 $\mu$ sec., period shall not exceed 12 $\mu$ secs., under less onerous conditions, however, this limitation may be exceeded.
- G. Temperature over the top 15 m.m. of the bulb to be limited to 150<sup>o</sup> C.
- H. Measured on a 1 Mc/s bridge in fully screened holder. No shield, all I.C. connections left floating.
- I. The Joint Services Catalogue Number is 5960-99-037-2303.



K1002	Test	Test Conditions	AQL %	Insp. Level	Sym-bol	Limits			Units
						Min	Bogey	Max.	
	<u>Group C.</u>	Combined AQL	4.0						
	Amplification Factor		2.5	I	$\mu_{g1-g2}$	7.5	9.5	11.5	-
	High Voltage Tail Test	V <sub>a</sub> = 4kV V <sub>g2</sub> = 800V V <sub>g1</sub> = -150V R <sub>K</sub> = 0 R <sub>L</sub> = 2M $\Omega$	2.5	I	I <sub>a</sub>	-	-	300	$\mu$ A
11.1	Vibration Noise	Note 4	2.5	I	V <sub>a</sub> AC	-	-	50	mV rms.
	Emission	A + g2 + g1 strapped V <sub>apk</sub> = 250V Note 5	2.5	I	I <sub>a</sub> pk	7.5	-	-	A
	<u>Group D</u>								
AIII	Capacitances	Measured on 1 Mc/s bridge with valve in fully screened holder. No shield. Note 6.	6.5	IC	C <sub>ag1</sub> C <sub>in</sub> C <sub>out</sub>	- 13.0 11.0	- 14.5 12.0	1.55 16.0 13.0	pF pF pF
	<u>Group E</u>								
11.3	Fatigue	V <sub>h</sub> = 6.9V Note 7.		IA					
	<u>Post Fatigue Tests</u>	Combined AQL	6.5						
	Heater Cathode Leakage Current	V <sub>hk</sub> = $\pm$ 100V	2.5		I <sub>hk</sub>	-	-	40	$\mu$ A
	Reverse Grid Current	R <sub>g1</sub> = 500K max.	2.5		-I <sub>g1</sub>	-	-	3.5	$\mu$ A
	Mutual Conductance		2.5		g <sub>m</sub>	7.0	-	11.5	mA/V
11.1	Vibration Noise	Note 8.	2.5		V <sub>a</sub> AC	-	-	100	mV rms.
11.4	<u>Shock</u>	No voltages. Hammer angle = 30 $^{\circ}$		IA					

K1001	Test	Test Conditions	AQL %	Insp. Level	Sym- bol	Limits			Units
						Min.	Bogey	Max.	
	<u>Group E (cont'd)</u>								
	<u>Post Shock Tests</u>	Combined AQL	6.5						
	Heater Cathode Leakage Current	Vhk = $\pm$ 100V	2.5		I <sub>hk</sub>	-	-	40	$\mu$ A
	Reverse Grid Current	Rgl = 500K max.	2.5			-	-	3.5	$\mu$ A
	Mutual Conductance		2.5		gm	7.0	-	11.5	mA/V
11.1	Vibration Noise	Note 8	2.5		VaAC	-	-	100	mV rms
AVI/5	<u>Group F</u>								
	Life	Va = 3.5kV Vg2 = 800V Vg1 = -150V Ia(pk) = 6.5A approx. Pulse length = 20 $\mu$ secs. P.R.F. = 50c/s Positive grid excursion = + 150V Anode load = 500 $\Omega$							
AVI/ 5.1	<u>Stability Life Test (1 hour)</u>								
	Change in Mutual Conductance		1.0	I	$\Delta$ gm	-	-	15.0	%
AVI/ 5.3	<u>Intermittent Life</u>				IC				
	<u>Test Point (500 hrs)</u>								
AVI/ 5.6	Inoperatives		2.5			-	-	-	-
	Heater Cathode Leakage Current	Vhk = $\pm$ 100V	6.5		I <sub>hk</sub>	-	-	35	$\mu$ A
	Reverse Grid Current	Rgl = 500K	6.5		-I <sub>gl</sub>	-	-	3.5	$\mu$ A
	Mutual Conductance		6.5		gm	7.0	-	11.5	mA/V

K1001	Test	Test Conditions	AQL %	Insp. Level	Sym-bol	Limits			Units
						Min.	Bogey	Max.	
	<u>Group F (Contd)</u>								
	Peak Anode Current	V <sub>a</sub> = 420V V <sub>g2</sub> = 800V V <sub>g1</sub> = -150V Note 1.	6.5		Ia pk.	5.0	-	-	A
	Insulation	V <sub>g1</sub> -all = -100V V <sub>g2</sub> -all = -300V	6.5		R R	50 50	- -	- -	MΩ MΩ
AIX/ 2.5	Electrical re-test after 28 days holding period			100°/c					
AVI/ 5.6	Inoperatives		0.5		-	-	-	-	-
	Reverse Grid Current	R <sub>g1</sub> = 500KΩ max.	0.5		-I <sub>g1</sub>	-	-	3.0	μA

NOTES

- Valve to be driven with 2 μsec. pulses at p.r.f. 500 c/s so that the grid voltage rises to 150V positive (max.).
- Valve to be driven with 2 μsec. pulses at p.r.f. 500 c/s so that the grid voltage rises to 50V positive (max.).
- Valve shall be given a minimum pre-heat time of 60 secs. with heater volts only. Initial arcing may be tolerated but the valve shall be free from arcing after a period of 1 minute after the H.T. has been applied.
- |                    |                      |                      |
|--------------------|----------------------|----------------------|
| VA(b) 250V         | R <sub>g1</sub> 10KΩ | C <sub>g2</sub> 2 μF |
| Vg2 150V           | R <sub>k</sub> 900Ω  | C <sub>a</sub> 0.5μF |
| R <sub>L</sub> 2KΩ | C <sub>k</sub> 50μF  | g 2.5                |
- T<sub>p</sub> 2μsecs. p.r.f. 50 c/s.
- The capacitance connections shall be:

Test	H.P.	L.P.	E.
C <sub>g1</sub>	T.C.	6	1,2, ,4,7,8,C.
C <sub>in</sub>	6	1,2,4,7,8,	T.C., C.
C <sub>out</sub>	T.C.	1,2,4,7,8,	6, C.

- Valves to be vibrated in each of the three required planes for not less than 30 hours, and not less than 100 hours, total. Heaters switched, one minute on, three minutes off. No other voltages applied. Minimum peak acceleration 5g. Frequency 170 c/s.
- Test conditions for vibration noise in Group C. shall apply.