MINISTRY OF SUPPLY ((D.L.R.D.(A))/R.A.E.

VALVE ELECTRONIC

CV407

Specification MOSA/CV.407
Issue 3 Dated 4.5.53
To be read in conjunction with K.1001

SECURITY	
Specification	Valve
UNCLASSIFIED	UNCLASSIFIED

→ Indicates a change

TYPE OF VALVE - Cathode Ray Tube
TYPE OF DEFLECTION - Electrostatic symmetrical
TYPE OF FOCUS - Electrostatic
BULB - Internally coated with conductive coating.
SCREEN - BEN
PROTOTYPE - VCRX 221

MARKING
See K.1001/4

BASE
B12D

CONNECTIONS

Pin	Electrode
1	G
2	C
3	H
4	H
5	A1
6	A2
7	Internal Coating (Note D)
8	Y_2
9	X_2
10	A_3
11	X_1
12	Y_1
S.C.	A_4

SIDE CONTACT
Snap Terminal

DIMENSIONS AND CONNECTIONS
See Drawing on page 4

RATING

			Note
Heater Voltage	(V)	4.0	
Heater Current	(A)	1.1	
Max. Fourth Anode Voltage	(kV)	6.0	A
Max. Third Anode Voltage	(kV)	4.0	A
Max. First Anode Voltage	(kV)	2.5	A
TYPICAL OPERATING CONDITIONS			
Fourth Anode Voltage	(kV)	4.0	
Third Anode Voltage	(kV)	2.0	
→ Second Anode Voltage	(V)	150	
First Anode Voltage	(kV)	2.0	
→ X-plate Sensitivity	(mm/V)	0.18	
→ Y-plate Sensitivity	(mm/V)	0.24	

NOTES

A. The tube shall operate with Va_1 = 2.5 kV, Va_3 = 3 kV, and Va_4 = 6 kV under conditions of reduced pressure equivalent to 6" of mercury at 15°C.

B. The tube shall be adequately free from microphony.

C. The tube shall be of the post deflection acceleration type, and the design shall be such that with Va_1 = 2.5 kV the focus shall be substantially unaffected by varying the value of Va_4 to that of Va_3. A change of ± 10% in Va_2 shall not produce an appreciable change in cut off voltage.

D. The tube will normally be operated with A_3 and conductive coating tied, and if the manufacturer so desires these electrodes may be strapped internally with the connection omitted from contact marked "internal coating".

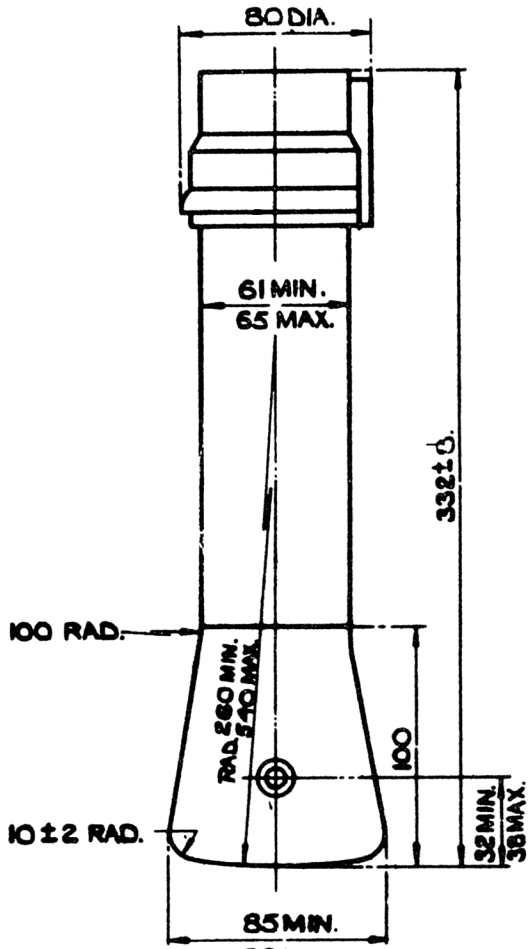
To be performed in addition to those applicable in K.1001

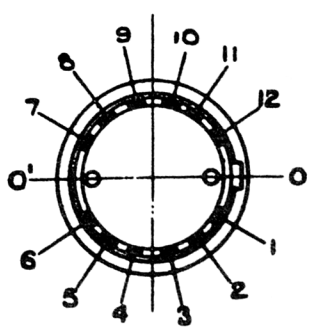
	Test Conditions	Test	Limits Min.	Limits Max.	No. Tested	Note
a	See K.1001/5A.13.	CAPACITANCES (pF)				
		1. Each X or Y plate to all other electrodes.	-	25	5%(10)	
		2. One X plate to one Y plate.	-	6	5%(10)	
		3. Grid to all other electrodes.	-	25	5%(10)	

Deflection voltages shall be applied symmetrically in all cases.

	Vh	Va_4 (kV)	Va_3 (kV)	Va_2	Va_1 (kV)	Vg					
b	4	0	0	0	0	0	Ih (A)	0.8	1.3	100%	
c	4	4	2	Adjust for optimum focus.	2	Adjust to cut off	Vg Value to be noted.	-	-100	100%	
d	4	4	2	ditto	2	-	(1) Vg (V)	-1	-	100%	
	Adjust Vg to give 2.5 orthochromatic candelas. Test to be carried out with a sine wave raster of size 3" x 3", and frequencies approximately 50 c/s and 10,000 c/s.						(2) Change in Vg from test (c) (V)	-	35	100%	
e	4	4	2	ditto	2	-	(1) Line width (mm)	-	1.0	100%	
	DEFLECTION with a sine wave time base of 10 kc/s nom. and line length of 66 mm in the X and 70 mm in the Y direction successively the line width to be measured at the centre of the trace. GRID The grid will be pulsed 35 volts positively from cut off with amplitude equal to the value obtained in test d(2), the nominal values of pulse duration and recurrence being 100 µsecs and 100 c/s respectively.						(2) Va_2 (V)	50	250	100%	
f	4	4	2	Any convenient Value.	2	-80	GRID INSULATION				
	Recommended method See K.1001/5A.3.2 Resistor = 10 Megohms.						1. Leakage Current (µA)	-	8	100%	
							2. Increase in Voltmeter Reading	-	100%	100%	

	Test Conditions						Test	Limits		No. Tested	Note
	Vh	Va_4 (kV)	Va_3 (kV)	Va_2	Va_1 (kV)	Vg		Min.	Max.		
g	4	4	2	Any convenient value	2	Any convenient value	DEFLECTION SENSITIVITIES (1) X-plate (mm/v) (2) Y-plate (mm/V)	 0.16 0.21	 0.20 0.27	 5%(10) 5%(10)	
h	4	4	2	ditto	2	ditto	Deviation of spot from centre of screen (mm)	-	6	100%	
j	4	4	2	ditto	2	ditto	Useful Screen Area 1. Deflections to cover stated rectangle. 2. Deviation of centre of boundary lines of raster from a true rectangle (mm)	 -	 ±2	 5%	
	Measurement to be made on a raster 50 x 55 mm in the X and Y directions successively.										
k	4	4	2	ditto	2	ditto	1. Orientation of X axis of deflection relative to 00' on drawing. 2. Orientation of the diameter through the centre of the snap terminals relative to 00'.	80° 80°	100° 100°	100% 100%	
l	4	4	2	ditto	2	ditto	Angle between X and Y axes of deflection.	88°	92°	100%	
m	4	4	2	ditto	2	ditto	The variation of brightness over any part of the area shall not exceed a 2 : 1 ratio.			100%	
	Deflecting voltages to give a raster covering the useful screen area. The spot shall be defocussed such that separate lines shall not be discernible on the raster.										





VIEW OF UNDERSIDE OF BASE.

NOTES:

1. THE INTERNAL CONDUCTIVE COATINGS SHALL BE OF SUCH DIMENSIONS THAT THEY FUNCTION EFFECTIVELY BUT DO NOT OBSCURE THE REQUIRED USEFUL SCREEN AREA.
2. WHEN VIEWING THE SCREEN WITH THE TUBE POSITIONED SUCH THAT THE SPIGOT IS UPPERMOST, A POSITIVE VOLTAGE APPLIED TO TERMINAL X_1, SHALL DEFLECT THE SPOT TO THE LEFT, AND A POSITIVE VOLTAGE APPLIED TO TERMINAL Y_1, SHALL DEFLECT THE SPOT UPWARDS.
3. THIS DIA. SHALL INCLUDE ANY PROTRUSION DUE TO SIDE CONTACT.

ALL DIMENSIONS IN MILLIMETRES.