VALVE ELECTRONIC

ADMIRALTY SIGNAL AND RADAR ESTABLISHMENT

CV2463

Specification AD/CV2463 Issue 1 Dated September, 1958. To be read in conjunction with K1001 and B.S.448.	SECURITY	
	Specification Unclassified	Valve Unclassified

TYPE OF VALVE:-	Cathode Ray Tube
TYPE OF DEFLECTION:-	Magnetic
TYPE OF FOCUS:-	Magnetic
TYPE OF ELECTRON GUN:-	Triode
SCREEN:-	009 Aluminium backed
PROTOTYPE:-	VCRX432 and VCRX433

MARKING
See K1001/4

BASE
B12A with metal shell and bakelite wafer with rounded edge. or BS448/B12A
See drawing on Page 8

Amdt 4

RATING (All limiting values are absolute)			NOTE
Heater Voltage	(V)	6.3	
Heater Current	(A)	0.6	A
Maximum Anode Voltage	(kV)	15.5	
Minimum Anode Voltage	(kV)	10	
Max. Heater-Cathode Voltage	(V)	150	B
Peak Beam Current	(μA)	100	
TYPICAL OPERATING CONDITIONS			
Anode Voltage	(kV)	15	
Grid Cut-off Voltage	(V)	-60 to -140	
Max. Grid Drive for I_b = 20μA	(V)	29.6	
CAPACITANCES			
Max. Cg to all other electrodes	(pF)	15	
Max. C_k to all other electrodes	(pF)	10	

CONNECTIONS

Pin	Electrode
1	h.
2	g.
3	No pin
4	No pin
5	No pin
6	Internal connection
7	External conductive coating. See Note F.
8	No pin
9	No pin
10	Internal connection
11	k.
12	h.
S.C.	a.

SIDE CONTACT
B.S.448. CT8

DIMENSIONS
See drawings pages 8 and 9

NOTES

A. Heater current may be between 0.27 and 0.66A.

B. Heater negative to Cathode.

C. The screen does not contain Beryllium.

D. To prevent damage to the screen the tube should always be operated at its minimum useful brightness.

E. The electrode system shields the electron beam from charges on internal insulators.

F. The external conductive coating, pin 7, should be connected at or near cathode potential. The inclusion of this coating is not compulsory, but it may be provided at the discretion of the manufacturer.

Z.17796.R.

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TESTS

To be performed in addition to those applicable in K1001.

Clause	Test	Test Conditions	AQL %	Insp. Level	Limits Min.	Limits Max.	Units
a	Capacitances	See K1001/5A.13.					
	1. Grid to all other electrodes.		6.5	II		15	pF
	2. Cathode to all other electrodes.		6.5	II		10	pF
	FOR ALL TESTS BELOW, Vh = 6.3 volts						
b	Heater Current						
	1. Limits			100%	0.27	0.66	A
	2. Deviation from manufacturer's nominal.			100%		± 10%	
c	Heater-Cathode Insulation Leakage Current	Vhk = -150 volts See K1001/5A.3.3		100%		100	/uA
	FOR ALL TESTS BELOW, EXCEPT THOSE OF CLAUSES "f" AND "m", Va = 15 kV						
d	Grid Cut-off Voltage Numerical Value, V_c (Note value of V_c for use in test "e")	Adjust for optimum focus. Adjust Vg for cut-off, see K1001/5A.10		100%	60	140	V
e	1. Grid Drive Voltage Vd Vd = change in Vg from value V_c noted in test "d"	Defocused beam, scanned, or deflected off usable screen area. Adjust Vg to give I_b = 20/uA.		100%		29.6	V
	2. Grid Drive Factor = (Vd minus 10) ÷ V_c			100%		0.14	
f	Screen Efficiency Beam current for the specified light intensity	Va = 10 kV Adjust Vg for a light intensity of 0.7 candela using a defocused raster of the largest convenient size.		100%		30	/uA

TESTS (Contd.)

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Clause	Test	Test Conditions	AQL %	Insp. Level	Limits Min.	Limits Max.	Units
g	Line Width Measured at the centre of the trace. (i)	Adjust for optimum focus with focus coil positioned as shown in drawing on page 8 (i) Linear line scan 200 mm long traced in 100 µS: grid driven from cut-off by 100 µS voltage pulses at PRF = 100 pps to give peak I_b = 20 µA.		100%		0.3	mm
	OR (ii)	(ii) Adjust Vg to give I_b = 20 µA, and provide an inter-laced 405 line T.V. raster of line length 200 mm, with the frame scan expanded to facilitate line width measurement.				0.25	mm
h	Position and Size of Unfocused Spot 1. Deviation NU of spot centre U from point N at which neck gauge axis intersects the screen.	No focus or defleoting fields. 1. Vg any convenient value to give a spot that will not damage the screen. Neck gauge as described on page 9		100%		5	mm
	2. Unfocused spot diameter.	2. Grid pulsed to give peak I_b = 20 µA with T_p = 100 µS and PRF = 100 pps	6.5	II		30	mm
j	Grid Insulation (i) Leakage current	(i) Vg = -140V		100%		14	µA
	OR (ii) Increase in voltmeter reading	OR (ii) See K1001/5A3.2 Resistor 10 megohms				100%	

TESTS (Contd.)

Clause	Test	Test Conditions	AQL %	Insp. Level	Limits Min.	Limits Max.	Units
k	Useful Screen Area Diameter through the geometrical centre of the screen.	Adjust for optimum focus and any convenient light intensity, and use a raster which covers the whole screen.		100%	200		mm
l	Persistence Decay time to 0.014 foot lamberts for screen at 15°C. The minimum acceptable decay time at any screen temperature between 15°C and 30°C which is "n" degrees above 15°C is $208 \times (1-0.04)^n$ seconds.	Screen to be scanned with a raster of convenient size. No focus field. Adjust Vg for a screen brightness of 2 foot lamberts. Excitation time 120 secs. ± 15 secs.	6.5	II	208		Secs.
m	Flash Over and Stray Emission Any flashover or stray emission can be ignored during the first 5 seconds when any emission shall be deflected off the screen. During the remaining 5 seconds there shall be no deflecting field and the tube shall be rejected if flash-over or stray emission causes visible screen excitation during this period.	Va = 18 kV. Vg = -170V Preheat cathode at Vh 6.3V for 10 minutes. The tube to be held with the screen horizontal and uppermost. Focus field as in clause g. The tube to be viewed for 10 seconds in a dark room or box whilst the neck of the tube is tapped with an approved forked rubber-covered wooden hammer at a minimum of 4 taps per second.		100%			

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TESTS (Contd.)

Clause	Test	Test Conditions	AQL %	Insp. Level	Limits Min.	Limits Max.	Units
n	Blemishes (Stones, bubbles and screen defects)	With an unfocused raster covering the useful screen area.		100%			
	1. Limit size	Blemishes:-				1.0	mm
	2. Number of Size A, including a maximum of 5 between 0.75 and 1.0 mm.	Size A. 0.5 to 1.0 mm dia.				10	
	3. Separation between those of Size A.	Size B. 0.37 to 0.5 mm dia. Ignore those of size less than 0.37 mm. dia. See Note 1.			15		mm
	4. Separation between those of Size B or Size A and B.				5		mm
	5. Number of blemishes of Size A and, or, B within a circle 25 mm dia. located anywhere on the useful screen area. (See Note 2)					5	
o	Glass Face Plate Quality						
	Both surfaces of the glass face plate must be smooth and polished and free from all surface contour variations, such as "orange-peel" variations, that would be apparent to the unaided eye.			100%			

TESTS (Contd.)

Clause	Test	Test Conditions	AQL %	Insp. Level	Limits Min.	Limits Max.	Units
p	Climatic Test of External Coating There shall be no sign of blistering or flaking of any external conductive coating.	K1001/10.1		T.A.			
q	Spot Movement At any time during a period of 8 hours the spot shall not move by more than 1 mm from its original position.	No focus or deflecting fields. Vg any convenient value as in test 'h' above.		T.A.			
r	Mechanical Shock Test The tube shall be subjected to an acceleration of approximately 60 g peak and 30 g mean for at least 30 milliseconds along the neck axis and, also in two mutually perpendicular directions normal to the neck axis. Clauses d, e, h and m shall be satisfied before and after this test.			T.A.			

Amdt 2

NOTES

1. If two or more blemishes are separated by a distance not greater than the maximum dimension of the largest blemish in the group, then the group of blemishes shall be considered as one blemish of dimension equal to the maximum overall dimension of the group.

2. Vent-pip blemishes may be ignored provided that there are no more than four of them and that they appear only on or outside the periphery of the minimum acceptable useful screen area.

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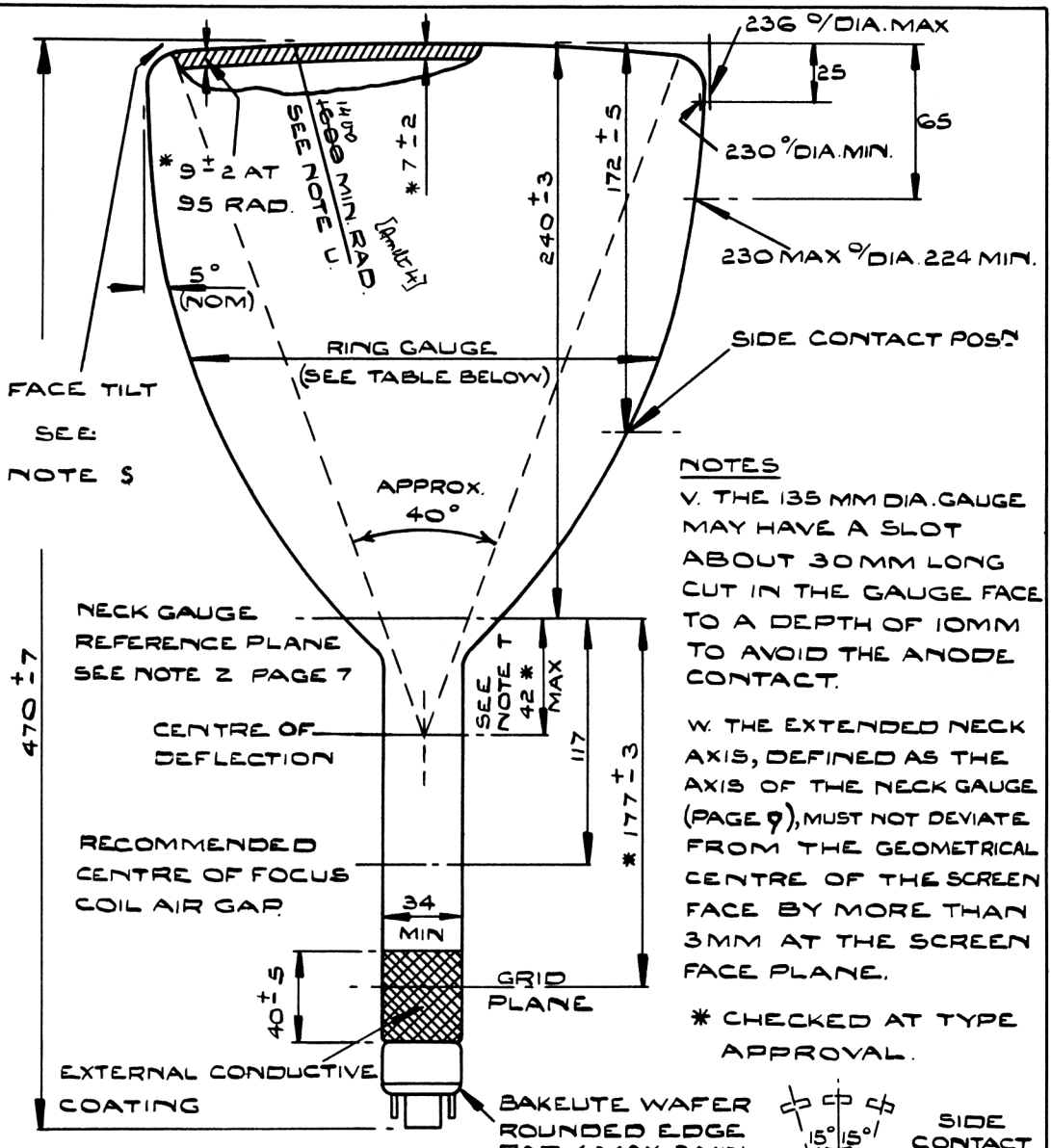
DRAWING NOTES

S. The face tilt shall be such that when the tube is rotated about the neck axis the total variation in the distance between the face plate and a fixed point on a plane perpendicular to the neck axis of rotation shall not exceed 3.5 mm, the point being at a radial distance of 100 mm from the axis of rotation. Amdt 3

T. The centre of deflection is the point on the neck axis where deflection appears to take place for the extreme positions of scan. In general, this is not at the centre of the physical length of the deflection coil.

U. The radius of screen curvature of 1400 mm minimum shall apply over a diameter of 208 mm centred on the geometrical centre of the screen. Amdt 4



NOTES

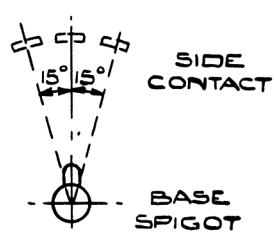
V. THE 135 MM DIA. GAUGE MAY HAVE A SLOT ABOUT 30 MM LONG CUT IN THE GAUGE FACE TO A DEPTH OF 10MM TO AVOID THE ANODE CONTACT.

W. THE EXTENDED NECK AXIS, DEFINED AS THE AXIS OF THE NECK GAUGE (PAGE 9), MUST NOT DEVIATE FROM THE GEOMETRICAL CENTRE OF THE SCREEN FACE BY MORE THAN 3MM AT THE SCREEN FACE PLANE. [Amdt 1]

* CHECKED AT TYPE APPROVAL.

RING GAUGE DIA.	DISTANCE FROM CENTRE OF TUBE FACE
200	126·75 ± 15
135	194 ± 8 SEE NOTE V.
90	223·75 ± 6

DIMENSIONS IN MILLIMETRES.



ORIENTATION OF SIDE CONTACT.

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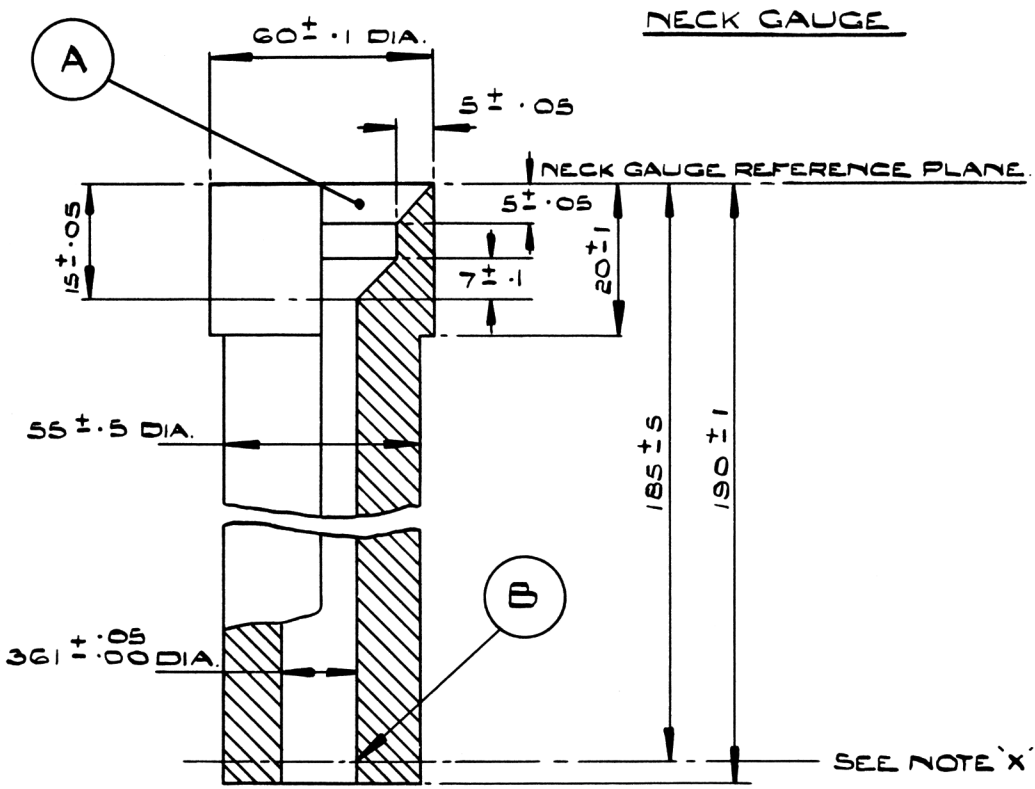

NOTES.

X. AT THIS PLANE THE GAUGE WILL INCLUDE A CENTERING DEVICE TO ALIGN THE GAUGE AXIS WITH THE NECK AXIS, WHERE THE NECK AXIS IS THE LOCUS OF THE AVERAGE RADIUS FOR AN IRREGULAR NECK. THE ACCURACY OF THE CENTERING DEVICE SHALL BE SUCH THAT IT IS CAPABLE OF REPEATEDLY CLAMPING A TRULY CIRCULAR BODY OF DIAMETER EQUAL TO THE NOMINAL NECK DIAMETER SO THAT ITS AXIS DOES NOT DEVIATE FROM THE GAUGE AXIS BY MORE THAN 0·05 MM.

Y. CONCENTRICITY OF ALL TURNING ON NECK GAUGE TO BE WITHIN ± 05 MM.

Z. THIS GAUGE SHALL SLIDE FREELY OVER THE TUBE BASE AND NECK AND LOCATE ON THE GLASSWORK ONLY AT THE CONICAL FACE (A) AND AT THE CENTERING DIAMETER POSITION (B)

DIMENSIONS IN MILLIMETRES.

ELECTRONIC VALVE SPECIFICATION AD/CV 2463,
ISSUE 1 DATED SEPTEMBER, 1958

AMENDMENT NO.1

Page 8.

In Note W, fourth line,
Amend "(Page 7)" to read "(Page 9)"

T.V.C. for A.S.R.E.

November, 1958.

N.44323R

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION AD/CV2463
ISSUE 1 DATED SEPTEMBER, 1958
AMENDMENT NO. 2

Page 6. Delete clause "r" Mechanical Shock Test

March, 1960

NK.16523/D

Admiralty Surface Weapons Establishment

AAS 9/60

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION AD/CV2463

ISSUE 1 DATED SEPTEMBER 1958

AMENDMENT NO.3

Page 7. Note S

Delete existing Note S and substitute the following:-

The face tilt shall be such that when the tube is rotated about the neck axis the total variation in the distance between the face plate and a fixed point on a plane perpendicular to the axis of rotation shall not exceed 3.50 mm, the point being at a distance of 100 mm from the axis of rotation.

December, 1960
N.46652/D

ADMIRALTY SURFACE WEAPONS ESTABLISHMENT.

9/3/61

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION AD/CV2463 ISSUE NO. 1 DATED SEPTEMBER 1958

AMENDMENT NO. 4

Page 1. In box headed "BASE", add following "edge" "or BS448/B12A".

Page 7. In Note "U" amend "1600 m.m. to read "1400 m.m."

Page 8. Amend the dimension "1600 MIN. RAD." (situated at the top of page, almost immediately below the "3" in CV2463) to read "1400 MIN. RAD."

TVC. for
ASWE

July, 1963
(196255)

12/10/63