

ADMIRALTY SURFACE WEAPONS ESTABLISHMENT

Specification AD/CV6085 Issue No. 2 dated November 1967 To be read in conjunction with K1001				SECURITY Specification Valve Unclassified Unclassified	
TYPE OF VALVE: S-band travelling wave tube power amplifier with low modulation noise.				MARKING See K1001/4	
CATHODE Indirectly heated				BASE	
ENVELOPE Metal capsule				B.S.448/B80	
PROTOTYPE VX3290					
RATINGS (All limiting values are absolute and non-simultaneous)			Note	CONNECTIONS	
				PIN	ELECTRODE
Heater Voltage	(V)	3.5		1	Heater h
Max. Heater Current	(A)	4.5	F	2	N.C.
Max. Grid 1 Voltage	(kV)	2.5	A B	3	Omitted
Max. Grid 1 Current	(mA)	1.5	A	4	Grid 1 g1
Max. Helix Voltage	(kV)	2.7	A B	5	N.C.
Max. Helix Current	(mA)	1.5	A	6	Helix hel
Max. Collector Voltage	(kV)	3	A B	7	Omitted
Max. Collector Current	(mA)	20	A	8	Heater/Cathode h,k
				Case	Collector/Earth Col
TYPICAL OPERATING CONDITIONS			H	DIMENSIONS	
Heater Voltage	(V)	3.5		See drawing on page 6	
Heater Current	(A)	3.5-4.5		MOUNTING POSITION	
Grid 1 Voltage	(kV)	0.5-1.0	A B	Any (but see Note D re cooling)	
Grid 1 Current	(mA)	0-1.0	A		
Helix Voltage	(kV)	2.0-2.3	A B		
Helix Current	(mA)	0-1.0	A		
Collector Voltage	(kV)	2.0-2.5	A B		
Collector Current	(mA)	14-16	A	WEIGHT	
Min. Working Saturated Power Output	(W)	0.5	G	Valve only: 2½ lbs	
Frequency Range	(GHz)	2.5-4.1		Valve in solenoid mount assembly	
Min. Gain at a Power Output of 0.5 watts	(dB)	20		4¾ lbs. (See Note J)	
Max. Noise Factor	(dB)	30			
Min. Insertion Loss	(dB)	25			
NOTES					
A. These figures are for operation in the approved solenoid mount assembly (see Note 2 on Page 4) and adjusted for minimum helix current. The minimum solenoid current required to focus the electron beam is 4 Amps when valve and mount are aligned for minimum helix current by means of the adjusting screws on the solenoid. The max. solenoid current is 8 Amps and the solenoid operating voltage is 16 volts (approx.) Max. voltage 32 volts. All voltages are positive relative to the cathode. The collector is connected to the capsule which is normally earthed. The helix voltage should never exceed the collector voltage.					

NOTES (CONT'D)

- B. Adjusted in operation
- C. The v.s.w.r. of the output and input couplers, measured when I col = 0 is not greater than 3:1. The valve must be operated in an r.f. circuit presenting a v.s.w.r. not greater than 5:1.
- D. The valve is designed for operation without forced air cooling when mounted in a horizontal position at an ambient temperature of 20°C. Cooling is normally effected by thermal conduction through the base plate, which must be mounted on a suitable heat sink, and by thermal convection from the radiator.

When operated in other mounting positions and/or higher ambient temperatures, forced air cooling may be required. The solenoid must be so mounted and cooled that no external part of the valve capsule is at a temperature in excess of 130°C.

- E. The performance of four tubes has been examined while operating and while subjected to the following tests:-

- (i) Resonance Search, amplitude 0.004" frequency sweep 0-30 c/s for 2 minutes, test performed three times.

- (ii) Vibration

<u>Amplitude</u> <u>Inches</u>	<u>Frequency</u> <u>c/s</u>	<u>Time</u> <u>Mins.</u>
0.030	0-11	2
0.020	11-16	1
0.010	16-21	1
0.004	21-30	2

Test performed three times

- (iii) Fatigue

Vibrated for 25 minutes with an amplitude of 0.010" at a frequency of 20 c/s.

Test performed six times.

Results

There was no measurable effect on gain, noise output and r.f. power output.

- F. The surge current shall not exceed 8 Amps.
- G. Conditions as in test clause f on page 3.
- H. A data sheet giving operating conditions is supplied with each valve.
- J. The solenoid mount assembly is not supplied with the valve. An outline drawing showing the valve in the solenoid mount assembly is shown on Page 7.
- K. The N.A.T.O. Stock number is 5960-99-037-2411.

TESTS

CV6085

To be performed in addition to those applicable in K1001

Tests are to be performed in the specified order unless otherwise agreed with the Inspecting Authority.

Test Conditions - Unless Otherwise Specified

Vh V Col
(V) (kV)
3.5 Vhel+150V

Clause	Test	Test Conditions	AQL %	Insp. Level	Sym- bol	Limits		Units
						Min.	Max.	
a	Heater Current	No voltages except Vh		100%	Ih	3.5	4.5	A
b	Grid 1 Voltage	Vhel = 2.3 kV increase Vg1 from zero until I Col = 15 mA Note 2		100%	Vg1	0.5	1.0	kV
c	Grid 1 Current	Conditions as in test b. Note 2		100%	Ig1	-	1.0	mA
d	Helix Current	Conditions as in test b. Note 2		100%	Ihel	-	1.0	mA
e	Helix Voltage	Increase Vg1 from zero until I Col = 15 mA Apply a signal of r.f. power 5 ± 0.5 mW frequency $3.3 \text{ GHz} \pm 50$ MHz to the input. Adjust Vhel to give max. r.f. power output. Note 2		100%	Vhel	2.0	2.3	kV
f	R.F. Power	Increase Vg1 from zero until I Col = 15 mA Vhel = value obtained in Test Clause (e)						
	(i) Output 1	Apply a signal of r.f. power 5 ± 0.5 mW to the input at frequencies $2.5 \text{ GHz} \pm 20 \text{ MHz}$ $3.3 \text{ GHz} \pm 20 \text{ MHz}$ $4.1 \text{ GHz} \pm 20 \text{ MHz}$ Note 2.		100%		0.5 0.5 0.5		W W W
	(ii) Input	Increase the r.f. power input until the output falls beyond saturation to 500 mW Note 2.		100%		65.0		mW

CV6085

Clause	Test	Test Conditions	AQL %	Insp. Level	Sym- bol	Limit		Units
						Min.	Max.	
f	R.F. Power(Contd.)							
	(iii) Output 2	As in f (i) Increase the r.f. power input to 70 mW Note 2		100%		0.4	2.8	W
	(iv) Output 3	As f (i) at frequency inter- vals of 100 MHz \pm 20 MHz over the band 2500 to 4100 MHz		Q.A.		0.5		W
g	High Level Noise Factor	Conditions as in test f(i). Frequency of r.f. signal = 3.3 GHz \pm 20 MHz. Notes 2 and 3		100%		-	30	dB
h	Cold v.s.w.r.	No voltages. Measured over the frequency range 2.5 to 4.1 GHz (a) Input (b) Output		100%		-		
						-	3:1	Ratio
j	Hot v.s.w.r.	D.C. conditions as in f(i). Measured over the frequency range 2.5 to 4.1 GHz (a) Input (b) Output Note 2		100%				
							6.5:1 6.5:1	Ratio Ratio
k	Life	Note 4		Note 4		Note 4		

NOTES

1. The surge current shall not exceed 8 Amps.
2. Measured with the valve operating in a solenoid mount assembly which has been approved by comparison with the reference standard held by the Qualification Approval Authority. During adjustment and test the helix current must not exceed 1.5 mA.
3. The noise factor is measured by comparing the noise with that from a standard noise source, the detector being a broad-band crystal and receiver having a pass-band 5-50 MHz.

CV6085/2/4

4. (a) The sample size shall be as follows:-

<u>Lot Size</u>	<u>Sample Size</u>
1-25	1
26-50	2
51-100	3
100 or greater	2%

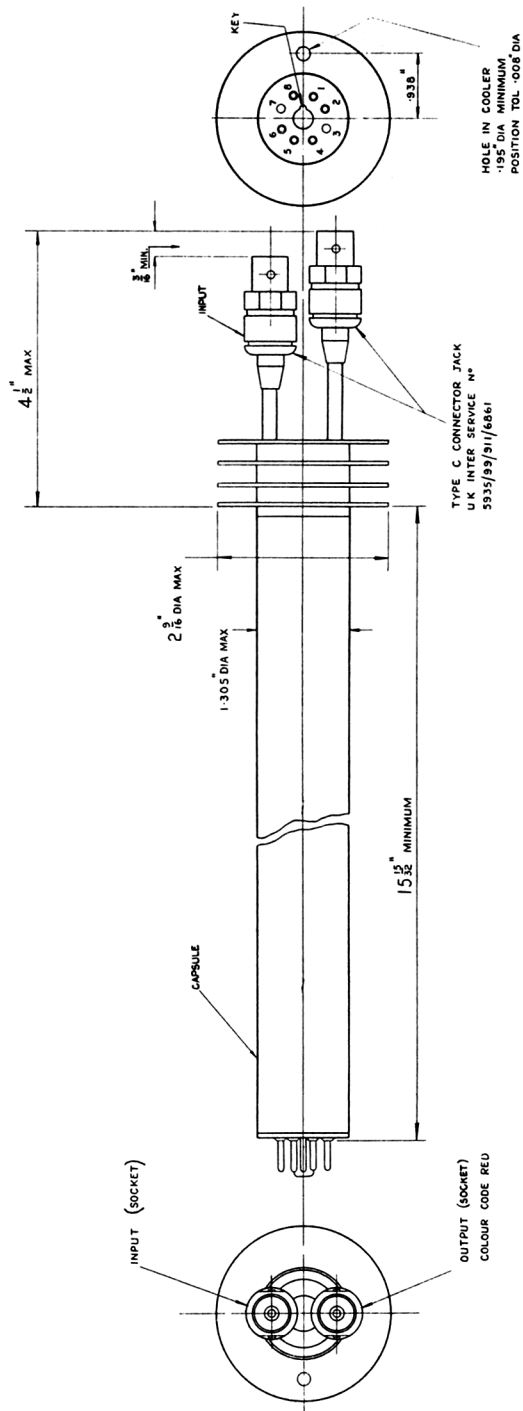
The manufacturer may test additional samples at his discretion.

- (b) For the first lot of any production order, deliveries shall be held until satisfactory completion of a minimum of 500 hours life.

Where previous life test data is available deliveries may be released at the discretion of the Inspection Authority.

Thereafter, where previous results have proved satisfactory, shipment of valves may be permitted without awaiting the results of current tests.

- (c) The criterion of acceptance shall be that the average life of the sample shall be at least 1,000 hours.
- (d) In the event of a failure, the Qualification Approval Authority shall be informed.
- (e) The end of life is reached when, after adjustment of the voltages within the specified limits, the valve fails to meet the Specification except that the levels of r.f. power output, noise and gain may deteriorate by 3 dB.



TOLERANCE
 DECIMAL ± .003
 FRACTION ± .004

DIMENSIONAL DRAWING OF VALVE

