

SPECIFICATION CV.4058 ISSUE 1 DATED 20.1.56

AMENDMENT 1

PAGE 2

GROUP C Line 1

Amend to read "Combined AQL 6.5. Insp. Level I".

PAGE 3

GROUP E Line 7

Amend to read "Fatigue. Insp. Level IA".

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

ELECTRONIC VALVE SPECIFICATION

SPECIFICATION CV.4058

ISSUE 1 - DATED 20th JANUARY, 1956.

AMENDMENT NO.2.

GROUP F.

Intermittent Life Test Point (500 hrs)

Electrode Insulation

Delete existing Electrode Insulation (at the end of the Group) and substitute the following:-

K1001 Ref.	Test	Test Conditions	AQL %	INSP LEVEL	SYMBOL	LIMITS							
						MIN	LAL	BOGEY	UAL	MAX	AID	UNITS	
	ELECTRODE	Vh = 6.3V Note 1	4.0										
	INSULATION	Vg -all = -100V Va -all = -300V		- -	R R	50 50	- -	- -	- -	- -	- -	- -	- -

MΩ
MΩ

Test Point (1000 hrs.)

Delete all reference to Heater Current Test.

Add at the end of this Group (after amode Current) the following:-

K100 Ref.	Test	Test Conditions	AQL %	INSP. LEVEL	SYMBOL	LIMITS							
						MIN	LAL	BOGEY	UAL	MAX	AID	UNITS	
	ELECTRODE	Vh = 6.3V Note 1	6.5										
	INSULATION	Vg -all = -100V Va -all = -300V			R R	30 30	- -	- -	- -	- -	- -	MΩ MΩ	

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

Specification MOS(A)/CV4058 Issue 1 Dated 20.1.56 To be read in conjunction with BS.448, BS.1409 and K.1001	<u>SECURITY</u>	
	<u>Specification</u> UNCLASSIFIED	<u>Valve</u> UNCLASSIFIED

TYPE OF VALVE - Reliable Miniature R.F. Power Triode				<u>MARKING</u> K1001/4		
CATHODE - Indirectly heated				Additional Marking:- 6100/6C4MA		
ENVELOPE - Glass						
PROTOTYPE - CV133				<u>BASE</u> BS.448/B7G		
R. E. T. M. A. - 6100/6C4MA						
<u>RATING</u>				<u>CONNECTIONS</u>		
				Pin		Electrode
Heater Voltage	(V)	6.3	C	1	a	
Heater Current	(A)	0.15		2	IC	
Max. Heater Cathode Voltage	(V)	±150	A	3	h	
Max. Operating Anode Voltage	(V)	330	A	4	h	
Max. Anode Voltage (Ia = 0)	(V)	550	A	5	a	
Max. Anode Dissipation	(W)	3.8	A	6	g	
Max. Mean Cathode Current	(mA)	21	A	7	k	
Max. Bulb Temperature	(°C)	170	C			
Max. Shock (short duration)	(g)	500		<u>DIMENSIONS</u>		
Max. Acceleration (continuous operation)	(g)	2.5		See BS.448/B7G/2.1		
Max. Operating Frequency	(Mc/s)	150		Size Ref. No. 2		
Amplification Factor		17	B	Dimensions (mm)		Min. Max.
Mutual Conductance	(mA/V)	2.2	B	A seated height		- 47.5
Anode Impedance	(kΩ)	7.7	B	C diameter		16.0 19.0
				D overall length		- 54.5
<u>CAPACITANCES (pF)</u>						
C in (nom.)		1.8	D	<u>MOUNTING POSITION</u>		
C out (nom.)		1.3	D	Any		
Ca, g (nom.)		1.6	D			
<u>NOTES</u>						
A. Absolute value.						
B. Measured at Va = 250V; Vg = -0.5 (Ia = 10.5 mA).						
C. <u>Caution to Electronic Equipment Design Engineers:</u> Special attention should be given to the temperature of valves to be operated in aircraft. Reliability will be seriously impaired if the maximum bulb temperature is exceeded. The life expectancy may be reduced if conditions other than those specified for life tests are imposed on the valve and will be reduced appreciably if absolute maximum ratings are exceeded. Both reliability and performance will be jeopardised if heater voltage ratings are exceeded; life and reliability performance are directly related to the degree that regulation of the heater voltage is maintained at its centre-rated value.						
D. Measured with valve unscreened.						

To be performed in addition to those applicable in K1001

To be performed in the specified order unless otherwise agreed with the Inspecting Authority

Test Conditions - unless otherwise specified												
Vh(V) 6.3 Va(V) 250 Vg(V) -8.5 Vhk(V) 0												
K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Sym. bol	Limits						Units
						Min.	LAL	Bogey	UAL	Max.	ALD	
11.1	Vibration	No Voltages		100%								
7.1	Glass Strain	No Voltages	2.5	I								
	<u>GROUP A</u>											
	Electrode Insulation	Vh = 6.3V. Note 1. Vg-all = -100V Va-all = -300V		100%	R	100	-	-	-	-	-	MΩ
	Reverse Grid Current			100%	R	100	-	-	-	-	-	MΩ
				100%	Ig	-	-	-	-	0.5	-	μA
	<u>GROUP B</u>											
	Heater Current	Combined AQL	1.0	II								
5.3	hk Leakage Current	Vhk = ±100V. Note 3 Vhk = -100V Cathode Positive	0.65	II	Ih	138	-	150	-	162	-	mA
			0.65	II	Ihk	-	-	-	-	10	-	μA
					V2	Ihk	-	-	-	3	-	μA
	Anode Current		0.65	II	Ia	6.5	-	-	-	14.5	-	mA
					V2	Ia	-	9.0	10.5	12.0	-	3.5 mA
	Mutual Conductance		0.65	II	gm	1.75	-	-	-	2.65	-	mA/V
					V2	gm	-	2.0	2.2	2.4	-	0.45 mA/V
	<u>GROUP C</u>											
	Anode Current	Combined AQL Vg1 = -30V	6.5	II								
	Reverse Grid Current	Vh = 6.9V. Note 7.	2.5	I	Ia	-	-	-	-	50	-	μA
11.1	Vibration Noise	Va(b) = 250V; RL = 2 kΩ Notes 5 and 6.	2.5	I	Ig	-	-	-	-	1.0	-	μA
			2.5	I	Va AC	-	-	-	-	7.0	-	mV
	<u>GROUP D</u>											
7.2	Base Strain	No Voltages.	6.5	IA								
5.9	Capacitances	Measured on 1 Mc/s bridge with valve mounted in a fully shielded holder. No valve screen or holder skirt. Pin 2 link to pin 7.	6.5	IC	C in	1.35	-	1.8	-	2.25	-	pF
					C out	0.98	-	1.3	-	1.62	-	pF
					Ca,g	1.2	-	1.6	-	2.0	-	pF

K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Sym. bol	Limits						Units
						Min.	LAL	Pogey	UAL	Max.	ALD	
	Amplification Factor		6.5	IA	μ	15.5	-	-	-	18.5	-	
	Mutual Conductance	Va = 100V; Vg = 0	6.5	IA	gm	2.5	-	-	-	4.0	-	mA/V
	Change of Mutual Conductance	Va = 100V; Vg = 0 Vh = 5.7V. Note 2	6.5	IA	Δ gm	-	-	-	-	15	-	%
	Power Oscillation	Va(b) = 300V Rg = 8.5 k Ω f = 150 Mc/s. Note 8	4.0	IA	PO	1.8	-	-	-	-	-	W
11.2	<u>GROUP E</u> Resonance Search	Va(b) = 250V RL = 2k Ω Frequency:- (1) 25-200 c/s (2) 200-500 c/s (3) 500-2500 c/s	2.5	IC	-	-	-	-	-	7	-	mV rms
					-	-	-	-	-	35	-	mV rms
					-	-	-	-	-	150	-	mV rms
11.3	Fatigue	Note 4. Vh = 6.9V.		I								
		<u>Post Fatigue Tests</u>										
	hk Leakage Current	Vhk = \pm 100V Note 3	2.5		Ihk	-	-	-	-	20	-	μ A
	Reverse Grid Current		2.5		Ig	-	-	-	-	1.0	-	μ A
	Mutual Conductance		2.5		gm	1.6	-	-	-	2.65	-	mA/V
11.1	Vibration Noise	As in Group C	2.5		Va AC	-	-	-	-	15	-	mV rms
11.4	Shock	Hammer Angle = 30 $^{\circ}$ No voltages.		IA								
		<u>Post Shock Tests</u>										
5.3	hk Leakage Current	Vhk = \pm 100V Note 3	2.5		Ihk	-	-	-	-	20	-	μ A
	Reverse Grid Current		2.5		Ig	-	-	-	-	1.0	-	μ A
	Mutual Conductance		2.5		gm	1.6	-	-	-	2.65	-	mA/V
11.1	Vibration Noise	As in Group C	2.5		Va AC	-	-	-	-	15	-	mV rms
A VI/5	<u>GROUP F</u> Life	Vhk = 150V D.C. Heater positive Note 9.										
A VI/5.1		<u>Stability Life (1 hour)</u>										
	Change in Mutual Conductance		1.0	I	Δ gm	-	-	-	-	10	-	%
A VI/5.2		<u>Survival Rate</u> <u>Life (100 hours)</u>										
5.6	Inoperatives		0.65	II								

K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Sym. bol	Limits						Units
						Min.	LAL	Bogey	UAL	Max.	ALD	
	<u>Intermittent Life</u>											
A VI/5.6	Test Point 500 hrs.	Combined AQL	6.5	IA								
	Inoperatives		2.5									
	Heater Current		2.5	Ih	138	-	-	-	162	-	mA	
5.3	hk Leakage Current	Vhk = ±100V. NOTE 3	2.5	Ihk	-	-	-	-	20	-	µA	
	Reverse Grid Current		2.5	Ig	-	-	-	-	0.5	-	µA	
	Mutual Conductance		2.5	gm	1.6	-	-	-	2.65	-	mA/V	
	Average Change in Mutual Conductance			Δgm	-	-	-	-	15	-	%	
	Anode Current		4.0	Ia	5.5	-	-	-	14.5	-	mA	
	Electrode Filtration	V_g max = 100V	4.0	R	50	-	-	-	-	-	Ω	
	Test Point 1000 hrs.	Combined AQL	10									
A VI/5.6	Inoperatives		4.0									
	Heater Current		1.0	Ih	138	-	150	-	162	-	mA	
5.3	hk Leakage Current	Vhk = ±100V. Note 3	4.0	Ihk	-	-	-	-	20	-	µA	
	Reverse Grid Current		4.0	Ig	-	-	-	-	0.5	-	µA	
	Mutual Conductance		4.0	gm	1.5	-	-	-	2.65	-	mA/V	
	Anode Current	See opp. Page	6.5	Ia	5.0	-	-	-	14.5	-	mA	
A IX/2.5	<u>GROUP G</u> Electrical Re-test after 28 days holding period			100%								
A VI/5.6	Inoperatives		0.5									
	Reverse Grid Current		0.5	Ig	-	-	-	-	0.5	-	µA	

NOTES

1. Heater and cathode strapped and considered as a single electrode.
2. Change of mutual conductance is expressed:

$$\frac{(\text{gm at } 6.3\text{V}) - (\text{gm at } 5.7\text{V})}{(\text{gm at } 6.3\text{V})} \times 100\%$$
3. Heater positive and negative successively.
4. Valves shall be vibrated in each of the three required planes for not less than 30 hours and not less than 100 hours total. Heater switched 1 minute on 3 minutes off. No other voltages. Minimum peak acceleration = 5g; frequency = 170 \pm 5 c/s.
5. The valve shall be mounted so that the direction of vibration is parallel to the minor axis of the mounting structure.
Vibration frequency = any fixed frequency in the range 25-100 c/s.
Minimum peak acceleration = 2g.
The test shall be of sufficient duration to obtain a steady reading of noise output.
6. Alternatively $V_a(b) = 250\text{V}$; $R_L = 2\text{k}\Omega$; $V_g = 0$; $R_k = 810\Omega$; $C_k = 1000\mu\text{F}$.
7. Prior to this test the valve shall be pre-heated for 5 minutes under the test conditions. I_g shall not be rising or out of limit after 10 minutes.
Alternative test conditions: $V_a(b) = 250\text{V}$; $V_g = 0$; $R_k = 810\Omega$ may be used for this test.
8. An average valve shall be set to give $I_a = 25\text{mA}$ by adjusting the load/tank circuit coupling while the load is simultaneously tuned to give maximum power output.
9. Life test conditions. $V_a = 250\text{V}$; V_g adjust so that the anode dissipation is 3.45 watts \pm 10%.
Cathode Bias may be used.