

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION CV.4067

ISSUE 1. DATED 17.10.56.

AMENDMENT No. 1.

PAGE 4. GROUP F. INTERMITTENT LIFE. TEST POINT (500 hours).

Electrode Insulation test insert "See Note 8".

TEST POINT (1000 hours).

Delete the Heater Current Test and add at the end of this group (after Anode Current Test) the following:

K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits						Units
						Min	LAL	Bogey	UAL	Max.	AID	
	Electrode Insulation	Vh = 6.3v. Note 8.	6.5		R	30	-	-	-	-	-	MQ
		Vg - all = -300v.		R	30	-	-	-	-	-	MQ	
		Vg2 - all = -300v. Vg1 - all = -100v.		R	30	-	-	-	-	-	MQ	

Director,
Royal Aircraft Establishment.

To be performed in addition to those applicable in K1001

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

Test Conditions - unless otherwise specified												
Vh(V)	Vg1(V)	Va(V)	Vg2(V)	Rk(chms)	Ck(MF)							
6.3	0	120	120	250 ±5%	1000 min.							
K1001 Ref.	Test	Test Conditions	ACL %	Insp. Level	Symbol	Limits						Units
						Min.	LAL	Bogey	UUL	Max.	ALD	
7.1	Glass Strain	No Voltages	6.5	I								
	<u>GROUP A</u>											
	Electrode Insulation	Vh = 6.3V. Note 8 Va-all = -300V Vg2-all = -300V Vg1-all = -100V		100% 100% 100%	R R R	100 100 100	- - -	- - -	- - -	- - -	MΩ MΩ MΩ	
	Reverse Grid Current	Rg1 = 500 kΩ max.		100%	Ig1	-	-	-	-	1.0	-	μA
	<u>GROUP B</u>											
	Heater Current	Combined ACL	1.0	II								
5.3	hk Leakage Current	Vhk = ±100V. Note 1 Vhk = -100V Cathode positive	0.65	II	Ihk V2	- -	- -	- -	- -	10	-	μA μA
	Anode Current		0.65	II	Ia V2	28 -	- -	35.0 -	- -	42	-	mA mA
	Screen Current		0.65	II	Ig2 V2	- -	- -	- -	- -	5.2	-	mA mA
	Mutual Conductance		0.65	II	gm V2	3.8 -	- -	4.8 -	- -	5.8	-	mA/V mA/V
	<u>GROUP C</u>											
	Change of Mutual Conductance	Combined ACL Vh = 5.7V Notes 6 & 7	6.5	I	Δgm	-	-	-	-	15	-	%
	Anode Current	Vg1 = -40V	2.5	I	Ia	-	-	-	-	200	-	μA
	Reverse Grid Current	Vh = 6.3V Note 4	2.5	I	Ig1	-	-	-	-	1.5	-	μA
11.1	Vibration Noise	Va = Vg2 = 120V; Rk = 500Ω RL = 2kΩ Note 2	2.5	I	Va AC	-	-	-	-	35	-	mV rms

K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits						Units
						Min.	LAL	Bogey	UAL	Max.	ALD	
	GROUP D											
5.12	Lead Fragility		6.5	IA								
5.9	Capacitances	Measured on 1 Mc/s bridge with valve mounted in a fully shielded holder. Valve screened	6.5	IC	C in C out Ca, g1	6.0 7.5 -	- - -	7.0 8.75 -	- - -	8.0 10.0 0.1	- - -	PF PF PF
	Power Oscillation	Note 5	6.5	IC	PO	5.0	-	-	-	-	-	W
	GROUP E											
11.2	Resonance Search	Va(b) = 120V; Vg2 = 120V; Rk = 500 Ω; Rl = 2kΩ Ck = 1000 μF Frequency:- (1) 25-200 c/s (2) 200-500 c/s (3) 500-2500 c/s	2.5	IC	Va AC Va AC Va AC							mV rms mV rms mV rms
11.3	Fatigue	Vh = 6.9V Note 3 <u>Post Fatigue Tests</u>		IA								
5.3	hk Leakage Current	Combined AQL Vhk = ±100V Note 1	4.0		Ihk	-	-	-	-	20	-	μA
	Reverse Grid Current	Rg1 = 500kΩ	2.5		Ig1	-	-	-	-	1.5	-	μA
	Mutual Conductance		2.5		gm	3.4	-	-	-	5.8	-	mA/V
11.1	Vibration Noise	As in Group C	2.5		Va AC	-	-	-	-	50	-	mV rms
11.4	Shock	Hammer Angle = 30° No voltages <u>Post Shock Tests</u>		IA								
5.3	hk Leakage Current	Combined AQL Vhk = ±100V Note 1	4.0		Ihk	-	-	-	-	20	-	μA
	Reverse Grid Current	Rg1 = 500 kΩ max.	2.5		Ig1	-	-	-	-	1.5	-	μA
	Mutual Conductance		2.5		gm	3.4	-	-	-	5.8	-	mA/V
11.1	Vibration Noise	As in Group C	2.5		Va AC	-	-	-	-	50	-	mV rms

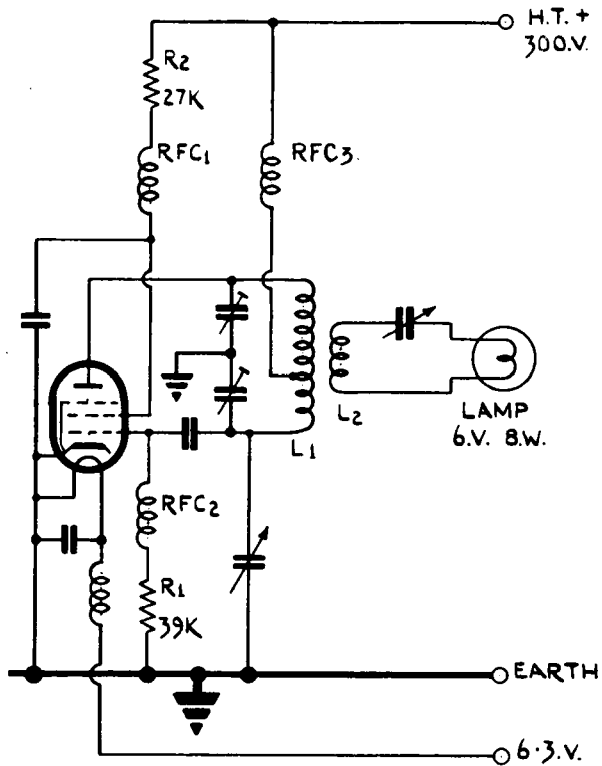
K1001 Ref.	Test	Test Conditions	AGL %	Insp. Level	Symbol	Limits					Units	
						Min.	LAL	Bogey	UML	Max.		ALD
	<u>GROUP F</u>											
A V1/5	Life	Vhk = 150V D.C. Heater positive. Va = Vg2 = 120V; Rk = 250 Ω ±10% Rg1 = 100k Ω ±20%										
	<u>Stability Life (1 hour)</u>			I								
	Change in Mutual Conductance		1.0		Δgm	-	-	-	-	10	-	%
	<u>Intermittent Life</u>			IA								
	<u>Test Point 500 hours</u>	Combined AGL	6.5									
AV1/5.6	Inoperatives		2.5									
5.3	hk Leakage Current	Vhk = ±100V Note 1	2.5		Ihk	-	-	-	-	20	-	μA
	Heater Current		2.5		Ih	410	-	450	-	490	-	mA
	Reverse Grid Current		2.5		Ig1	-	-	-	-	1.5	-	μA
	Mutual Conductance		2.5		gm	3.3	-	-	-	5.8	-	mA/V
	Average Change in Mutual Conductance				Δgm	-	-	-	-	15	-	%
	Anode Current		4.0		Ia	24	-	-	-	42	-	mA
	Electrode Insulation	Va-all = -300V Vg2-all = -300V Vg1-all = -100V	4.0		R	50	-	-	-	-	-	MΩ
					R	50	-	-	-	-	-	MΩ
					R	50	-	-	-	-	-	MΩ
	<u>Test Point 1000 Hours</u>	Combined AGL	10.0	IA								
AV1/5.6	Inoperatives		4.0									
5.3	hk Leakage Current	Vhk = ±180V Note 1	4.0		Ihk	-	-	-	-	20	-	μA
	Heater Current		4.0		Ih	410	-	450	-	490	-	mA
	Reverse Grid Current	Rg1 = 500 kΩ max.	4.0		Ig1	-	-	-	-	1.5	-	μA
	Mutual Conductance		4.0		gm	3.1	-	-	-	5.8	-	mA/V
	Anode Current		6.5		Ia	22	-	-	-	42	-	mA

K1001 Ref.	Test	Test Conditions	AQ. %	Insp. Level	Symbol	Limits						Units
						Min.	LAL	Boggy	UWL	Max.	ALD	
	<u>GROUP G</u>											
AIX/2.4	Electrical Re-test after 28 days holding period			100%								
AVI/5.6	Inoperatives		0.5									
	Reverse Grid Current	Rg1 = 500 kΩ max.	0.5		Ig1	-	-	-	-	1.0	-	μA

NOTE

1. Heater positive and negative successively.
2. The valve shall be mounted so that the direction of vibration is parallel to the minor axis of the electrode structure.
Vibration frequency = any fixed frequency in the range 25-100 c/s min. peak acceleration = 2.5g. The test shall be of sufficient duration to obtain a steady reading of noise output.
3. 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 applied. Min. peak acceleration = 5g; frequency = 170 ±5 c/s.
4. Ig1 shall not be rising or out of limit after a total of 10 minutes running.
5. Measured in an approved test circuit with Va(b) = 300V; Rg2 = 27 kΩ; Rg1 = 39 kΩ; Ig1 = 1.1 mA approx.; frequency = 50 Mc/s min. Typical circuit is shown on page 6.
6. The change of Mutual Conductance is expressed as:
$$\frac{(\mu\text{m at } 6.3\text{V}) - (\mu\text{m at } 5.7\text{V})}{(\mu\text{m at } 6.3\text{V})} \times 100\%$$
7. Prior to the test the valve shall be preheated for not less than 10 minutes under the test conditions.
8. Heater and cathode strapped and considered as a single electrode.

TYPICAL 50 Mc/s. POWER OSCILLATOR CIRCUIT



$R_2 = 27K \pm 5\%$ 5.W. WIRE WOUND

$RFC_{1, 2 \text{ \& } 3} = 50 \text{ Mc/s CHOKES.}$