

SPECIAL QUALITY VOLTAGE REFERENCE TUBE

M8098

85V gas-filled reference tube for use in equipment where mechanical vibration and shocks are unavoidable.

This data should be read in conjunction with the GENERAL OPERATIONAL RECOMMENDATIONS - VOLTAGE STABILISER AND REFERENCE TUBES and the GENERAL NOTES - SPECIAL QUALITY VOLTAGE STABILISER AND REFERENCE TUBES which precede this section of the handbook; the index numbers are used to indicate where reference should be made to a specific note.

LIMITING VALUES (absolute ratings)

Minimum voltage necessary for ignition (Note 1)	115	V
Cathode current		
Maximum	10	mA
Minimum	1.0	mA
Maximum bulb temperature (Note 2)		
During operation (Note 3)	90	°C
During storage and stand by	70	°C
Minimum ambient temperature	-55	°C
Maximum negative anode voltage	75	V
Maximum starting current (Note 4)	40	mA
Maximum vibrational acceleration	}	For details see Test specification
Maximum shock (short duration)		

PREFERRED OPERATING CONDITION

Cathode current	6.0	mA
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CHARACTERISTICS (at preferred operating condition, 20 to 30°C, Note 5)

Initial values

Maintaining voltage (variation from tube to tube)	83 to 87	V
Maximum jump voltage (1 to 10mA)	100	mV (pk)
Typical noise voltage (30c/s to 10kc/s)	60	μV (r.m.s.)
Incremental resistance		
Maximum	450	Ω
Average	300	Ω

Life performance

Maximum variation of maintaining voltage at 25°C		
For continuous operation at preferred current		
0 to 300 hours	0.26	V
300 to 1000 hours	0.17	V
Typical variation of maintaining voltage per 1000 hours, after the first 1000 hours	0.09	V

SHORT-TERM STABILITY

Maximum short-term variation of maintaining voltage for any 8 hour period after the first 100 hours life will be better than 0.01% provided there is an initial warming-up period of 3 minutes.

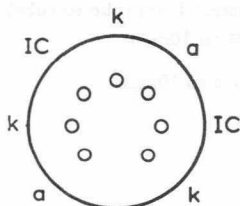
Maximum short-term (100 hours max.) variation of maintaining voltage after the first 300 hours of life is 0.1%.

In order to avoid voltage variations due to temperature fluctuations it will in general be sufficient to draught shield the tube.

NOTES

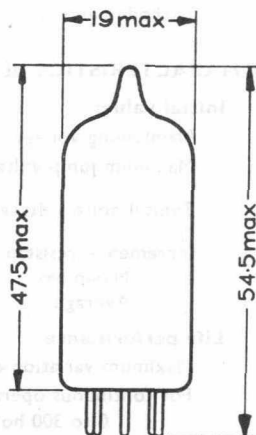
1. This value holds good over life in light or darkness. In total darkness an ignition delay of up to approx. 5 seconds may occur.
2. During conduction the bulb temperature is approximately 10°C above ambient temperature.
3. If the tube is to be operated with a bulb temperature above 70°C the cathode current should not be less than 6.0mA.
4. To be restricted for long life to 60 seconds once or twice in every 8 hours use.
5. Equilibrium conditions are reached within 3 minutes.

6317



B7G Base

All dimensions in mm



The bulb and base dimensions of this tube are in accordance with BS448, Section B7G.

M8098

R_{lim} (k Ω)	$I_{burning}$ (mA)
5.0	6.0

After initial warming-up period of 3 minutes at burning current of 6mA.

	A.Q.L. ²		Individuals ³	
	(%)		Min.	Max.
GROUP A				
Ignition voltage. Illumination 5 to 50 ft. cd.	..	..	—	115 V
Maintaining voltage	..	..	83	87 V
Change in maintaining voltage for burning current change from 5.8 to 6.2mA	..	..	—	180 mV
Voltage jumps. Burning current varies from 1 to 10mA. R _a = 500Ω	..	..	—	100 mV (pk-pk)
Oscillation. Burning current varies from 1 to 10mA. R _a = 500Ω ..	..	..	—	5 mV (pk-pk)
Microphonic noise. R _d = 500Ω	..	..	—	15 mV (pk-pk)
Leakage current. Supply voltage = 55V, R _a = 1MΩ ..	..	..	—	5 μA

Ignition voltage in darkness, after 24 hours in darkness	..	2.5	—	115
Change in maintaining voltage for burning current change from 1 to 10mA	..	2.5	—	4.0

+This test is carried out on a 100% basis.

TESTS

GROUP C

- Glass strain test ^{8A}. No applied voltage
- Base strain test ⁹. No applied voltage

A.Q.L. ² (%)	Individuals ³ Min. Max.
6.5	—
6.5	—

Resonance search

Vibrated at 2g over frequency range specified.

25 to 500c/s	..	..	..	..	2.5	5 mV (r.m.s.)
500 to 2500c/s	..	..	..	..	2.5	15 mV (r.m.s.)

Fatigue¹¹

No applied voltage, 5g min. peak acceleration, $f = 170\text{c/s}$ for 33 hours in each of 3 mutually perpendicular planes

Post fatigue tests

Change in maintaining voltage	..	..	..	..	2.5	± 0.7 V
Microphonic noise as in Group A	..	..	..	..	2.5	30 mV (pk-pk)
Sub-group quality level ⁷	..	..	..	..	4.0	—

Shock¹²

No applied voltage, 500g

Post shock tests

Change in maintaining voltage	..	..	..	..	2.5	± 0.7 V
Microphonic noise as in Group A	..	..	..	..	2.5	30 mV (pk-pk)
Sub-group quality level ⁷	..	..	..	..	4.0	—



GROUP D

Life test¹¹

Burning current = 6mA continuous

Life test end points, 1000 hours

Inoperatives ¹³	..	..	..	..	2.5	—	—
Ignition voltage	..	..	..	..	2.5	—	115 V
Change in maintaining voltage	..	..	..	..	2.5	—	±0.4 V
Change in maintaining voltage for burning current change from 5.8 to 6.2mA	..	..	..	..	2.5	—	180 mV

GROUP E

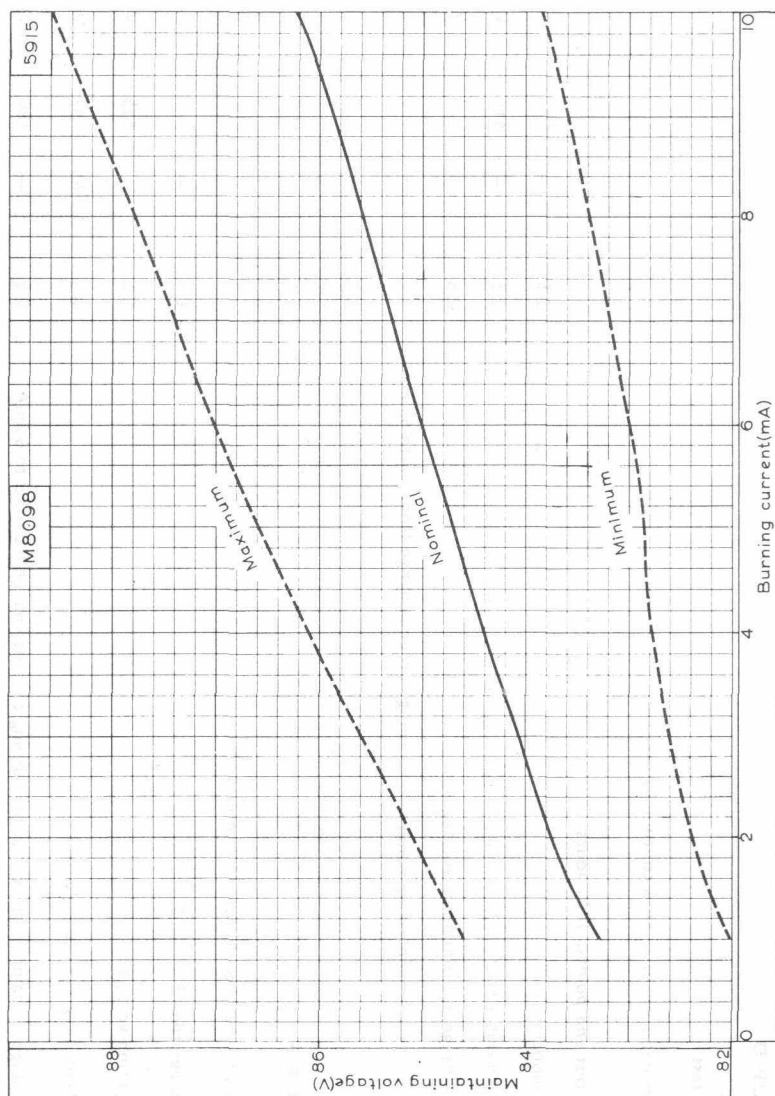
Tubes are held for 28 days and retested for

Inoperatives ¹³	..	..	..	..	0.5	—	—
Ignition voltage	..	..	..	..	0.5	—	115 V
Maintaining voltage	..	..	..	..	0.5	83	87 V
Change in maintaining voltage for burning current change from 5.8 to 6.2mA	..	..	..	..	0.5	—	180 mV



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REFERENCE TUBE



MAINTAINING VOLTAGE PLOTTED AGAINST BURNING CURRENT

