

SPECIAL QUALITY STABILISING TUBE

M8163

Special Quality 150 volt gas-filled voltage stabiliser 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 LEVEL 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 VALUES¹ (absolute ratings)

Minimum voltage necessary for ignition (Note 1)	180	V
Cathode current		
Maximum	15	mA
Minimum	5	mA
Maximum negative anode voltage	130	V
*Maximum vibrational acceleration	2.5	g
*Maximum shock (short duration)	500	g

*See page D3

CHARACTERISTICS at room temperature (Note 2)

Initial values

Maintaining voltage at $I_a = 10\text{mA}$		
Maximum	154	V
Minimum	146	V
Cathode current above which the incremental resistance is positive	5	mA
Incremental resistance (approx.) at $I_a = 10\text{mA}$	250	Ω
Temperature coefficient of maintaining voltage (approx.) at $I_a = 10\text{mA}$	0.007	%/°C (10mV /°C)
Voltage jumps ($R_a = 2k\Omega$)		
Typical maximum over the current range 10 to 15mA	75	mV
Maximum over the current range 5 to 15mA	250	mV
Increase in maintaining voltage as cathode current is increased over the range 5 to 15mA (regulation)		
Maximum	5.0	V
Typical	< 4.0	V

Life performance

At a continuous cathode current of 10mA,
and at room temperature

Limits of variations of maintaining voltage

In 1000hrs. (maximum)	± 1.0	%
In 10,000hrs. (typical)	± 2.0	%

Typical regulation after 10,000 hours

< 6.0	V
-------	---

NOTES

1. This value covers operation in light or darkness. In total darkness an ignition delay of up to about 300ms may occur.
2. Thermal equilibrium is reached within 3 minutes of igniting the tube.

TEST CONDITIONS (unless otherwise stated)

R_a (k Ω)	I_a (mA)
5	10

After initial warming-up period of 3 minutes at cathode current of 10mA.

TESTS	AQL ²	Individuals ³	
	(%)	Min.	Max.
GROUP A			
Leakage current (Supply voltage = 55V, R _a = 1MΩ) *	*	—	5 μA
Ignition time (illumination 5 to 50 lm/ft ²) V _b = 180V *	*	—	300 ms

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

GROUP B

Maintaining voltage	0.65	146	154	V
Change in maintaining voltage for cathode current change from 5 to 15mA	0.65	—	5	V
Microphonic noise	0.65	—	30	mV (pk-pk)

GROUP C

Voltage jumps. Cathode current varied from 15 to 5mA $R_a = 2k\Omega$	2.5	—	250	mV
Ignition time ($V_b = 180V$) In complete darkness after 24 hours in darkness	2.5	—	300	ms

GROUP D	AQL ²	Individuals ³	
		Min.	Max.
Glass strain ^{8A}	6.5	—	—
Base strain ⁹	6.5	—	—
Resonance search, vibrated at 2g over the frequency range specified			
20 to 400c/s	2.5	—	4 mV (pk-pk)
400 to 2000c/s	2.5	—	20 mV (pk-pk)

Fatigue¹¹

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

Post fatigue tests

Ignition time (illumination 5 to 50 lm/ft ²)			
$V_b = 180\text{V}$	2.5	—	300 ms
Change in maintaining voltage	2.5	—	± 1.5 V
Change in maintaining voltage for cathode current change from 15 to 5mA	2.5	—	5.5 V

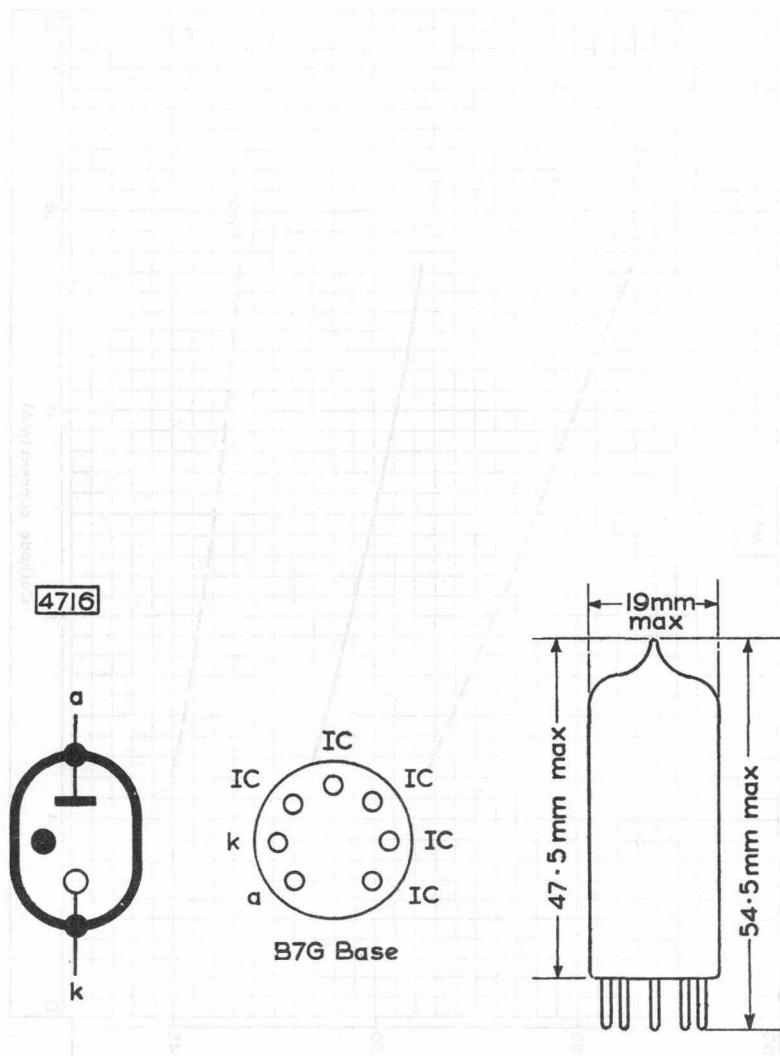
Shock¹²

No applied voltage 500g

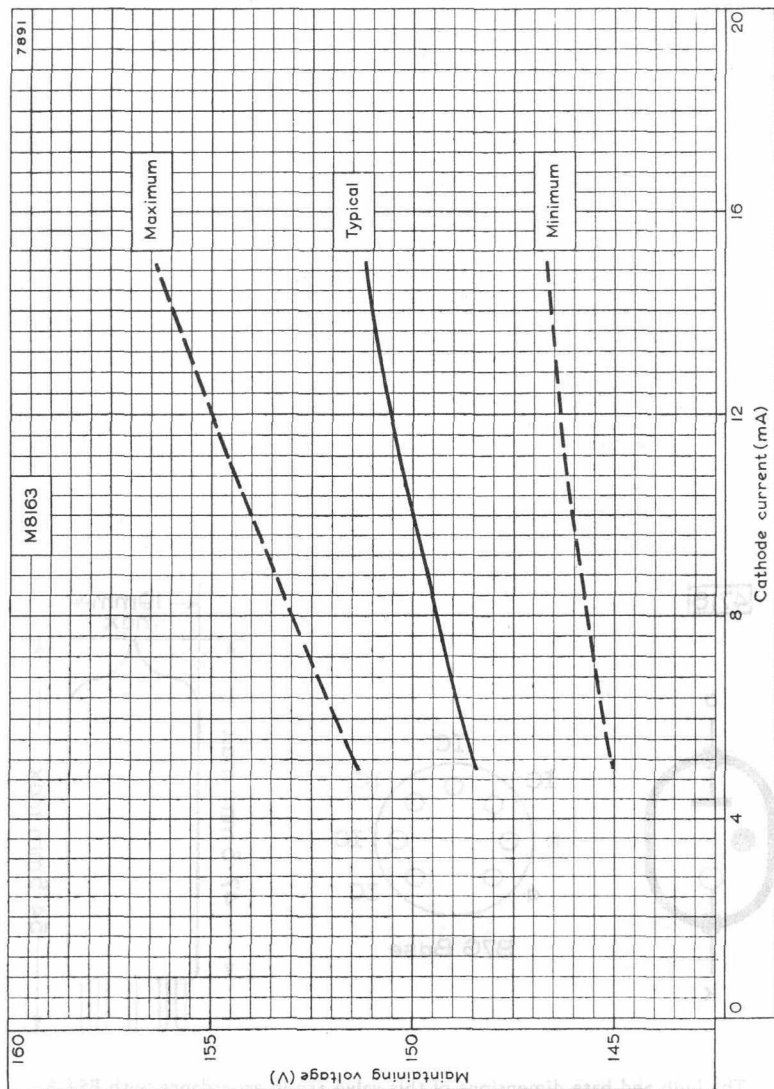
Post shock tests

Ignition time (illumination 5 to 50 lm/ft ²)			
$V_b = 180\text{V}$	2.5	—	300 ms
Change in maintaining voltage	2.5	—	± 1.5 V
Change in maintaining voltage for cathode current change from 15 to 5mA	2.5	—	5.5 V

GROUP E	AQL ²	Individuals ⁸	
	(%)	Min.	Max.
Life test¹¹			
Cathode current = 10mA continuous			
Life test end points 500hrs.			
Inoperatives ¹³	2.5	—	—
Ignition time (illumination 5 to 50 lm/ft ²)			
V _b = 180V	2.5	—	300 ms
Change in maintaining voltage	2.5	—	± 1.5 V
Change in maintaining voltage for cathode current change from 15 to 5mA	2.5	—	5.5 V
Sub-group quality level ⁷	6.5	—	—
Life test end points 1000hrs.			
Inoperatives ¹³	4.0	—	—
Ignition time (illumination 5 to 50 lm/ft ²)			
V _b = 180V	4.0	—	300 ms
Change in maintaining voltage	4.0	—	± 1.5 V
Change in maintaining voltage for cathode current change from 15 to 5mA	—	—	5.5 V
Sub-group quality level ⁷	10	—	—
GROUP F			
Tubes are held for 28 days and retested for			
Inoperatives ¹³	0.5	—	—
Ignition time (illumination 5 to 50 lm/ft ²)			
V _b = 180V	0.5	—	300 ms
Maintaining voltage	—	146	154 V



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



MAINTAINING VOLTAGE PLOTTED AGAINST CATHODE CURRENT