

SPECIAL QUALITY VOLTAGE AMPLIFYING PENTODE

M8195

Special quality low noise low hum pentode for use in equipment where mechanical vibration and shocks are unavoidable and where statistically controlled major electrical characteristics are required.

This data should be read in conjunction with the GENERAL NOTES—SPECIAL QUALITY VALVES which precede this section of the handbook and the index numbers are used to indicate where reference should be made to a specific note.

HEATER

V_{h1}	6.3	V
I_{h1}	200	mA

CAPACITANCES² (measured without an external shield)

C_{a-g1}	< 50	mpF
C_{in}	3.8	pF
C_{out}	5.1	pF

CHARACTERISTICS³

V_a	250	V
V_{g3}	0	V
V_{g2}	140	V
I_a	3.0	mA
I_{g2}	550	μ A
g_m	2.0	mA/V
r_a	2.5	M Ω
μ_{g1-g2}	38	
V_{g1}	-2.0	V
R_k	0	Ω

LIMITING VALUES⁴ (absolute ratings)

$V_{a(b)}$ max.	550	V
V_a max.	300	V
p_a max.	1.0	W
$V_{g2(b)}$ max.	550	V
V_{g2} max.	200	V
p_{g2} max.	200	mW
I_k max.	6.0	mA
R_{g1-k} max. ($p_a > 200$ mW)	3.0	M Ω
R_{g1-k} max. ($p_a < 200$ mW)	10	M Ω
V_{h-k} max.	100	V
Maximum acceleration (continuous operation)	2.5	g
Maximum shock (short duration)	500	g
T_{bulb} max.	165	$^{\circ}$ C

TEST CONDITIONS (unless otherwise specified)

V_h	V_a	V_{g3}	V_{g2}	V_{g1}	R_k	V_{h-k}
(V)	(V)	(V)	(V)	(V)	(Ω)	(V)
6.3	250	0	140	-2.0	0	0

Lot standard
deviations
Max.

Lot average?
Min. Max.

Individuals⁶
Bogey⁹ Min. Max.

A.Q.L.⁵
(%)

TESTS

GROUP A

Insulation

a-rest, g_2 -rest measured at -300V

g_1 -rest measured at -100V

Reverse grid current, R_{g1} max. = 500k Ω

M Ω
M Ω
 μ A

GROUP B

Heater current

Heater to cathode leakage current

V_{h-k} = 100V (cathode negative)

V_{h-k} = 100V (cathode positive)

Anode current

Screen-grid current

Mutual conductance

Microphony. V_b = 200V, R_a = 100k Ω ,
 R_{g2} = 680k Ω , R_{g1} = 470k Ω , R_k = 1.2k Ω ,
 C_k = 100 μ F, C_{g2} = 0.1 μ F. Impact = 50g,
at rt. angles to the axis.

Control grid voltage (r.m.s.)

mA
 μ A
 μ A
mA
mA
 μ A
mA/V
mA/V

mV
(pk-pk)

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Grid hum. $V_b = 200V$, $R_a = 100k\Omega$, $R_{g2} = 680k\Omega$, $R_{g1} = 470k\Omega$, $R_k = 1.2k\Omega$, $C_k = 100\mu F$, $C_{g2} = 0.1\mu F$. Pins 4 and 5 earthed alternately. Hum referred to the grid	0.65	—	—	8.0	—	—	μV
Cathode hum. $V_b = 200V$, $R_a = 100k\Omega$, $R_{g2} = 680k\Omega$, $R_{g1} = 470\Omega$, $R_k = 1.2k\Omega$, $C_{g2} = 0.1\mu F$. Pins 4 and 5 earthed alternately. Hum referred to the grid	0.65	—	—	60	—	—	μV
Hiss. $V_h = 6.3V$ d.c., $V_b = 200V$, $R_a = 100k\Omega$, $R_{g2} = 680k\Omega$, $R_{g1} = 470k\Omega$, $R_k = 1.2k\Omega$, $C_{g2} = 0.1\mu F$, $C_k = 100\mu F$. Hiss referred to the grid	0.65	—	—	5.0	—	—	μV
Group quality level ¹⁰	2.5	—	—	—	—	—	—
GROUP C							
Anode current, $V_{g1} = -7.0V$, $R_a = 1.0M\Omega$	2.5	—	—	40	—	—	μA
Change in mutual conductance, $V_h = 5.7V$	2.5	—	—	15	—	—	$\frac{0}{\%}$
Reverse grid current, $V_h = 6.9V$	2.5	—	—	1.0	—	—	μA
Group quality level ¹⁰	6.5	—	—	—	—	—	—
GROUP D							
Glass strain test ^{11A} . No applied voltages	6.5	—	—	—	—	—	—
Base strain test ¹² . No applied voltages	6.5	—	—	—	—	—	—
Capacitances ² (unshielded). No applied voltages	6.5	—	—	—	—	—	mpF
C_{a-g1}	—	—	—	50	—	—	pF
C_{in}	—	—	—	3.4	—	—	pF
C_{out}	—	—	—	4.5	—	—	pF
Amplification factor (μ_{g1-g2})	6.5	—	—	34	—	—	—



TESTS

GROUP E

Fatigue¹⁴

$V_h = 6.9V$, 1 minute on 3 minutes off. No other voltages applied, 5g min. peak acceleration, $f = 170 \pm 5c/s$ for 33 hours in each of 3 mutually perpendicular planes.

Post fatigue tests

Heater to cathode leakage current.

$V_{h-k} = \pm 100V$

Reverse grid current, R_{g1} max. = 500k Ω

Mutual conductance

Microphonic noise as in group B

Cathode hum as in group B

Sub-group quality level¹⁰

Shock¹⁵

No applied voltages, 500g

Post shock tests

Heater to cathode leakage current

$V_{h-k} = \pm 100V$

Reverse grid current, R_{g1} max. = 500k Ω

Mutual conductance

Microphonic noise as in group B

Cathode hum as in group B

Sub-group quality level¹⁰

A.Q.L. ⁵ (%)	Individuals		Lot average ⁷		Lot standard deviation ⁸ Max.
	Bogey ⁹	Min.	Min.	Max.	
2.5	—	—	—	—	μA
2.5	—	—	—	—	μA
2.5	—	1.0	—	—	mA/V
2.5	—	—	—	—	V (pk-pk)
2.5	—	—	—	—	μV
6.5	—	—	—	—	—
2.5	—	—	—	—	μA
2.5	—	—	—	—	μA
2.5	—	1.0	—	—	mA/V
2.5	—	—	—	—	V (pk-pk)
2.5	—	—	—	—	μV
6.5	—	—	—	—	—

A.Q.L.⁵
(%) Min. Max.

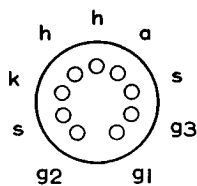
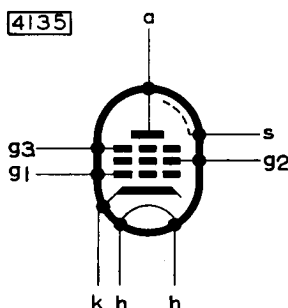
GROUP G

Valves are held for 28 days and retested for
Inoperatives¹⁶

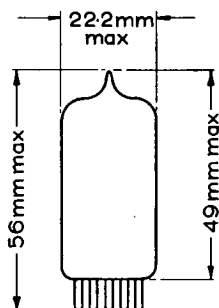
Reverse grid current R_{g1} max. = 500k Ω

0.5	—	—	
0.5	—	0.4	μA

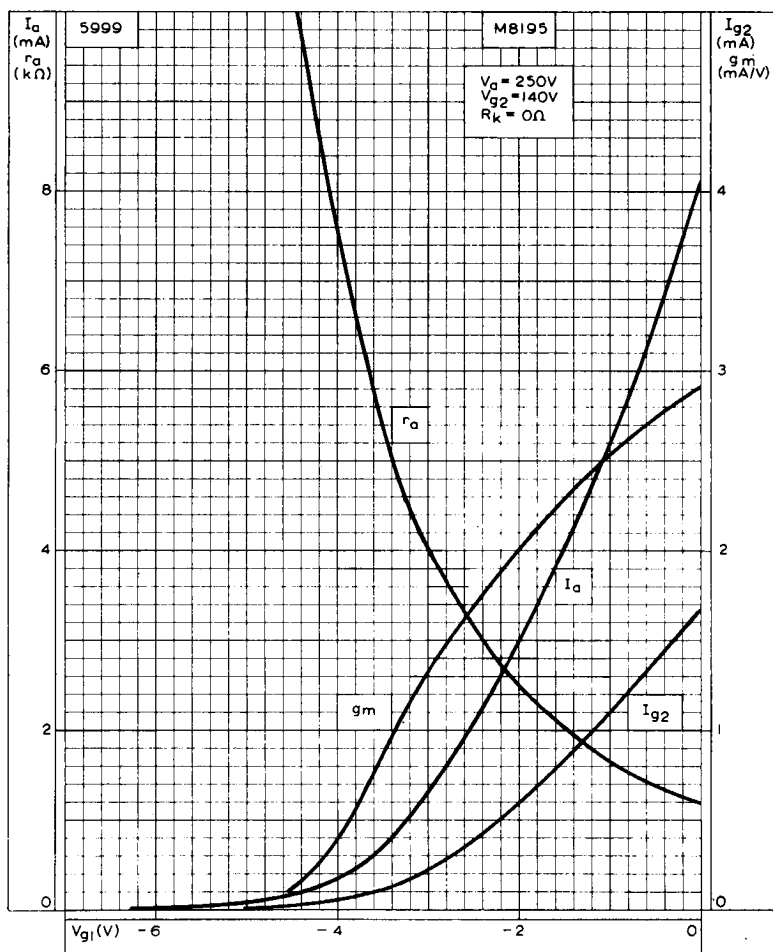
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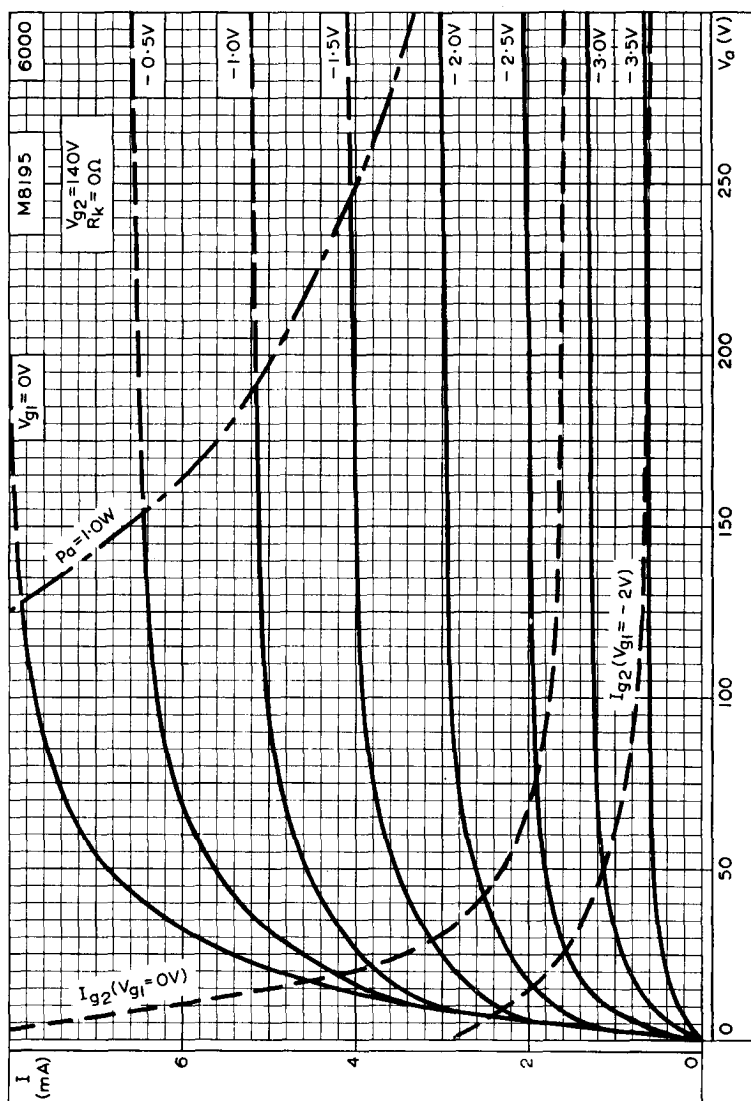
B9A Base



The bulb and base dimensions of this valve are in accordance with BS448, Section B9A.



ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE



ANODE AND SCREEN-GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER

