

# **BRIMAR**

**RECEIVING VALVE**

**50C5**

**APPLICATION REPORT VAD/507.7**

*Standard Telephones and Cables Limited*

**FOOTSCRAY, KENT, ENGLAND**

**INTRODUCTION:** The Brimar valve type 50C5 is a miniature indirectly heated beam tetrode. The heater is of the 150 milliamp type and is intended for operation in series with other valves having a similar heater current, such as in AC/DC equipment. The valve is suitable for use only on 110 volt mains or in equipment employing an HT line voltage not exceeding 140 volts.

**DESCRIPTION:** The valve consists of a beam tetrode unit capable of an output of the order of 2 watts. The unit is mounted in a standard T5½ bulb and is based with a B.V.A. Standard type B7G base.

This report contains characteristics of the valve and details of its use as a tetrode in push-pull or single ended amplifiers, and as a triode in push-pull or single ended amplifiers.

## CHARACTERISTICS:

<b>Cathode:</b>	Indirectly heated	
	Voltage (nominal)	50 volts
	Current	0.15 ampere*
	Max. DC Heater Cathode potential	180 volts

\* The heater current should not vary more than 5% from the rated value at any time, particularly is this important if the valve is used near its maximum ratings.

<b>Dimensions:</b>	Max. Overall Length	2-5/8 ins.
	Max. Diameter	3/4 in.
	Max. Seated Height	2-3/8 ins.

**Base:** Type B7G

<b>Basing Connections:</b>	Pin 1 Cathode and $g_3$
	Pin 2 Control Grid $g_1$
	Pin 3 Heater
	Pin 4 Heater
	Pin 5 Control Grid $g_1$
	Pin 6 Screen $g_2$
	Pin 7 Anode

<b>Ratings:</b>	Max. Anode Voltage	135 volts
	Max. Screen Voltage	117 volts
	Max. Anode Dissipation	5.5 watts
	Max. Screen Dissipation	1.25 watts

<b>Capacities (approx.) †</b>	$c_{g, a}$	0.64 pF
	c Input ( $c_{in}$ )	13 pF
	c Output ( $c_{out}$ )	6.1 pF
	$c_{h, k}$	17 pF

† Measured without shield.

**CHARACTERISTIC CURVES:** Curves are attached to this report which show:

Anode current plotted against anode volts for various values of grid voltage for the valve connected as a tetrode ( $I_a/V_a$ ) (Curve No. 307.261).

Anode current plotted against anode volts for various values of grid voltage for the valve connected as a triode ( $I_a/V_a$ ) (Curve No. 307.262).

## TYPICAL OPERATION

### Class A1 Amplifier (single ended):

Heater Current	0.15 ampere
Anode Voltage	110 volts
Screen Voltage	110 volts
Grid Voltage	-7.5 volts
Autobias Resistance	140 ohms
Anode Current	49 mA
Screen Current	4 mA approx.
Anode Impedance ( $r_a$ )	10,000 ohms
Mutual Conductance	7.5 mA/V
Inner Amplification Factor ( $\mu$ )	5
Anode Load Resistance	2500 ohms
Peak AF Grid Voltage	7.5 volts
Total Harmonic Distortion	9%
Power Output	1.9 watts

A curve is attached to this report which shows the relation between power output, distortion and input signal voltage (Curve No. 307.263).

### Class A1 Amplifier Push-Pull:

Heater Current	0.15 ampere
Anode Voltage	110 volts
Screen Voltage	110 volts
Grid Voltage	-7.5 volts
Autobias Resistance	70 ohms
Anode Current	98 mA
Screen Current	8 mA approx.
Output Load (anode-anode)	4000 ohms
Peak AF Grid Voltage (grid-grid)	15 volts
Total Harmonic Distortion	7%
Power Output	3.75 watts

Note.—Values given are for two valves.

A curve is attached to this report which shows the relation between power output, harmonic distortion, and input signal voltage (Curve No. 307.264).

### Class A1 Amplifier (Triode connected) (single ended):

Heater Current	0.15 ampere
Max. Anode and Screen Dissipation (total)	6.75 watts
Max. Anode Voltage	110 volts
Grid Voltage	-7.5 volts
Autobias Resistance	140 ohms
Anode Current	53 mA
Anode Impedance ( $r_a$ )	850 ohms
Mutual Conductance	8.2 mA/V
Amplification Factor ( $\mu$ )	7
Load Resistance	1000 ohms
Harmonic Distortion	4.8%
Max. Power Output	350 milliwatts

A curve is attached to this report showing the relation between power output, harmonic distortion, and signal input voltage (Curve No. 307.265).

**Class A1 Amplifier (Triode connected) (Push-Pull):**

Heater Current	0.15 ampere
Anode Voltage	110 volts
Grid Voltage	—7.5 volts
Autobias Resistance	70 ohms
Anode Current	106 mA
Output Load (anode-anode)	2000 ohms
Peak AF Grid Voltage (grid-grid)	15 volts
Total Harmonic Distortion	2.1%
Power Output	0.75 watts

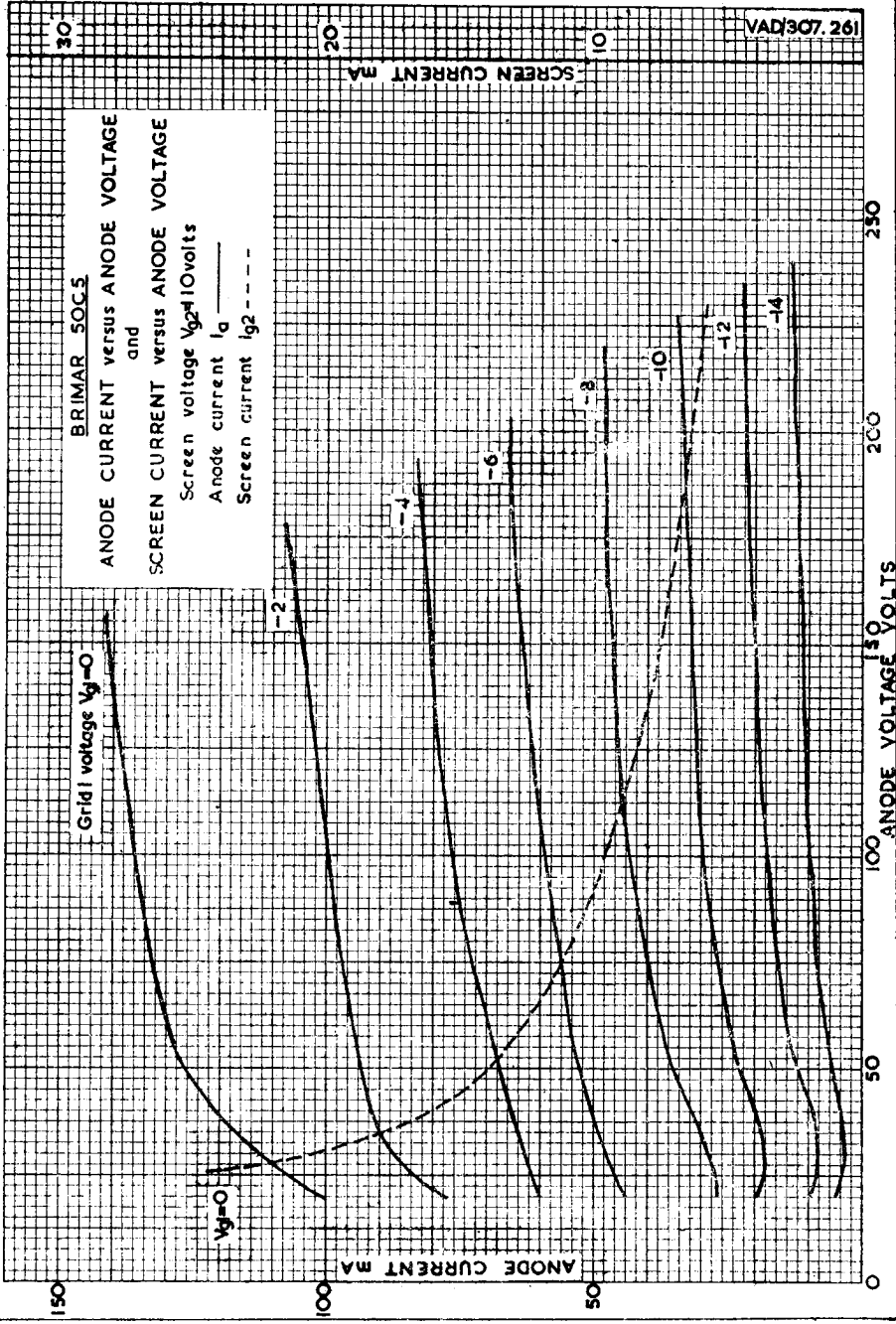
*Note.*—Values given are for two valves.

Curves are attached to this report which show the relation between power output, harmonic distortion, and input signal voltage (Curve No. 307-266).

BRIMAR 50C5  
ANODE CURRENT versus ANODE VOLTAGE  
and  
SCREEN CURRENT versus ANODE VOLTAGE  
Screen voltage  $V_{g2}$  110volts  
Anode current  $I_a$  \_\_\_\_\_  
Screen current  $I_{g2}$  - - - -

Grid 1 voltage  $V_{g1}$  0

$V_{g1}$  0

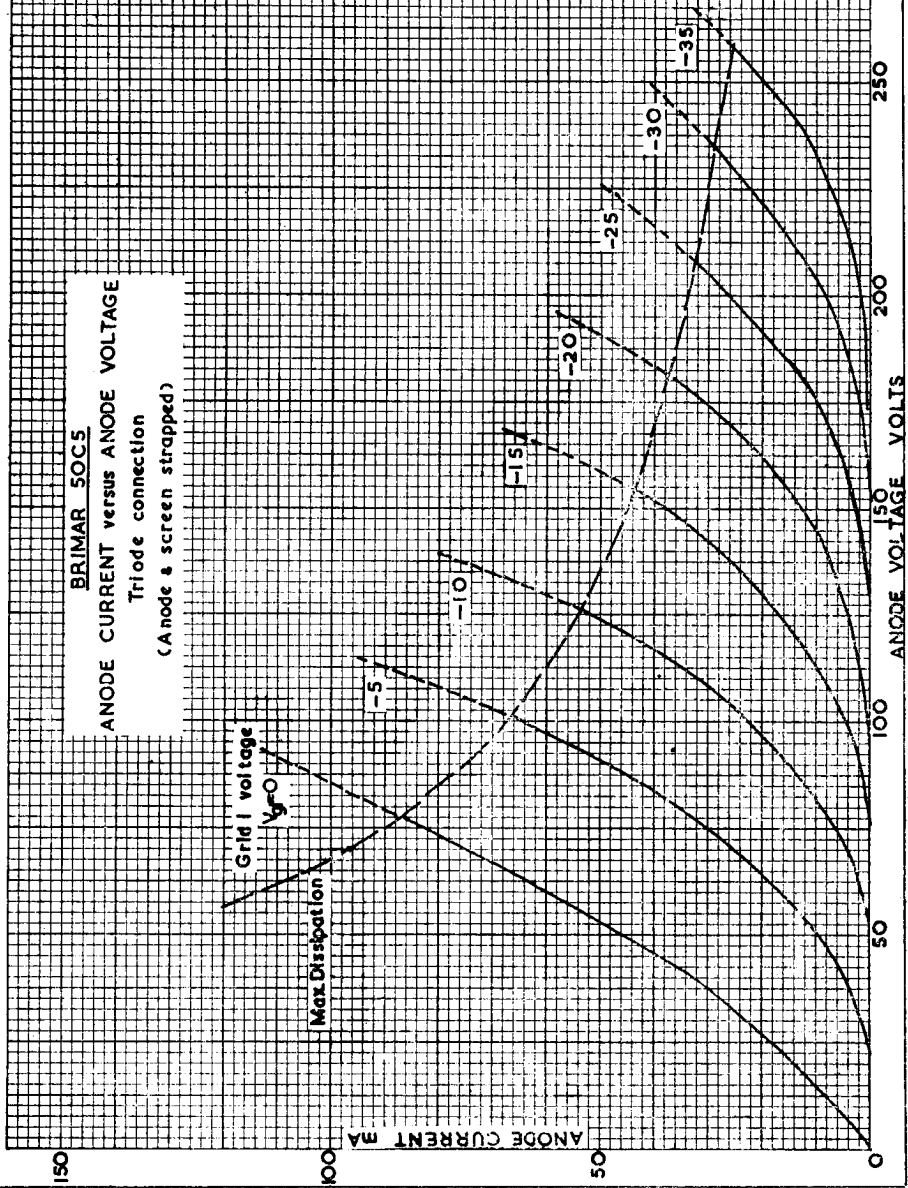


ANODE CURRENT MA

SCREEN CURRENT MA

ANODE VOLTAGE VOLTS

**BRIMAR 50C5**  
**ANODE CURRENT versus ANODE VOLTAGE**  
Triode connection  
(Anode & screen strapped)



150

ANODE CURRENT MA

250

200

150

100

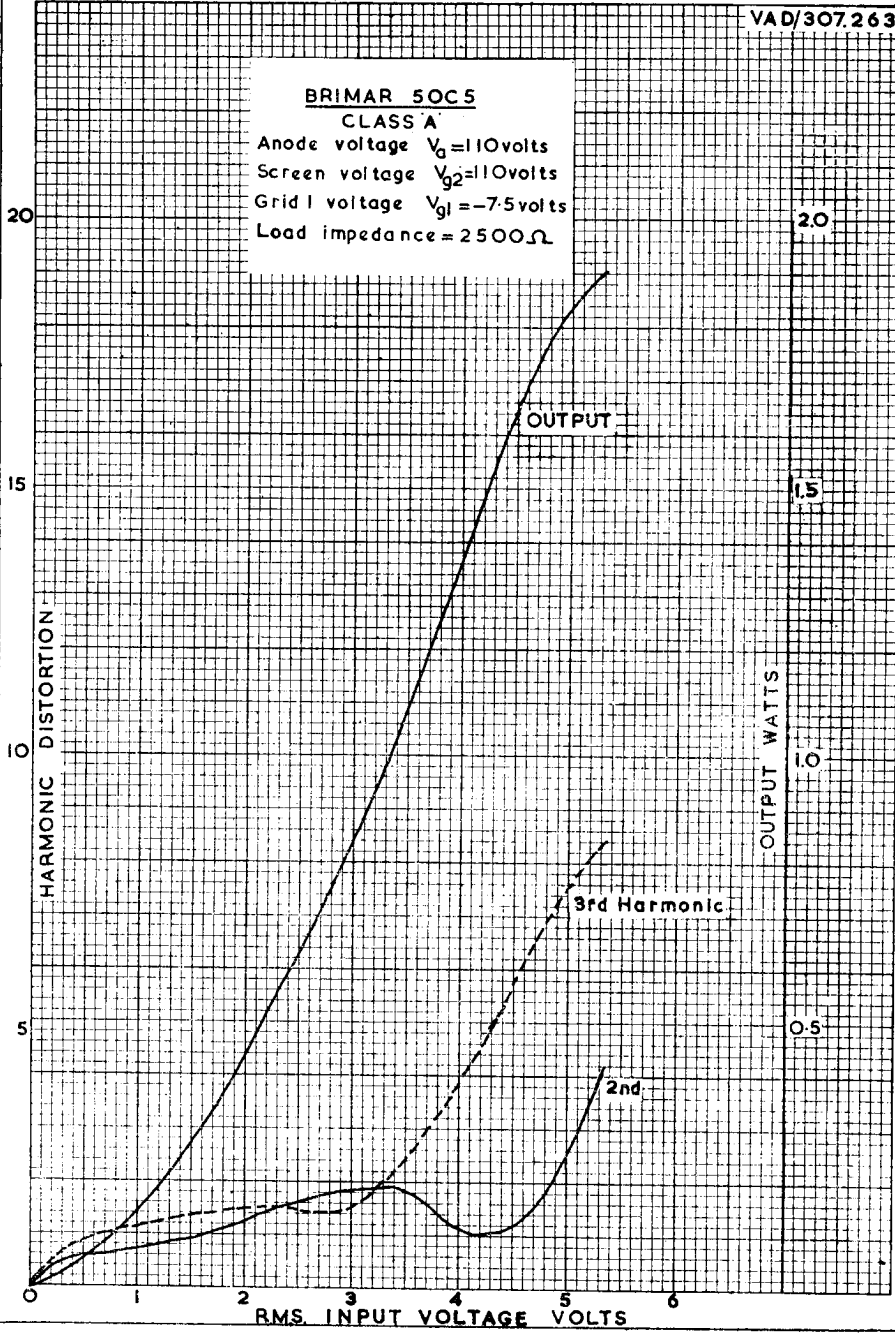
50

ANODE VOLTAGE VOLTS

**BRIMAR 50C5**

**CLASS A**

Anode voltage  $V_a = 110$  volts  
Screen voltage  $V_{g2} = 110$  volts  
Grid 1 voltage  $V_{g1} = -7.5$  volts  
Load impedance =  $2500 \Omega$



**BRIMAR 50C5**

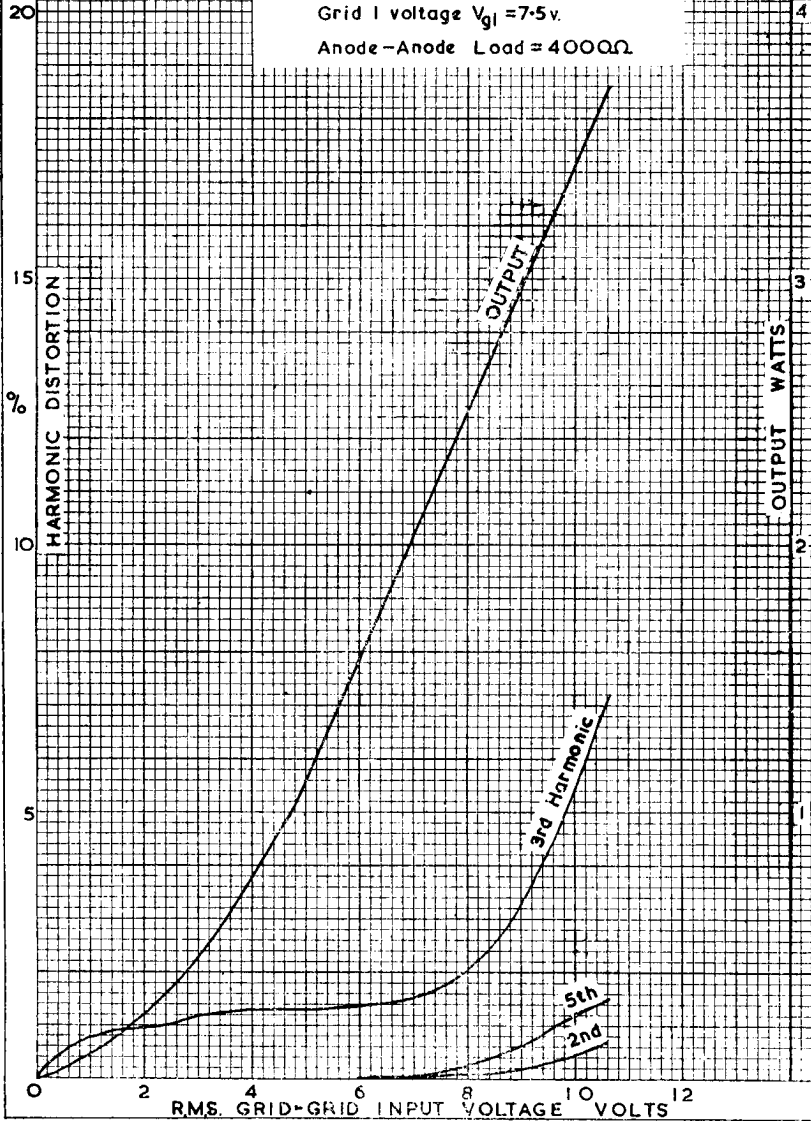
CLASS A PUSH-PULL

Anode voltage  $V_a = 110\text{v}$ .

Screen voltage  $V_g = 110\text{v}$ .

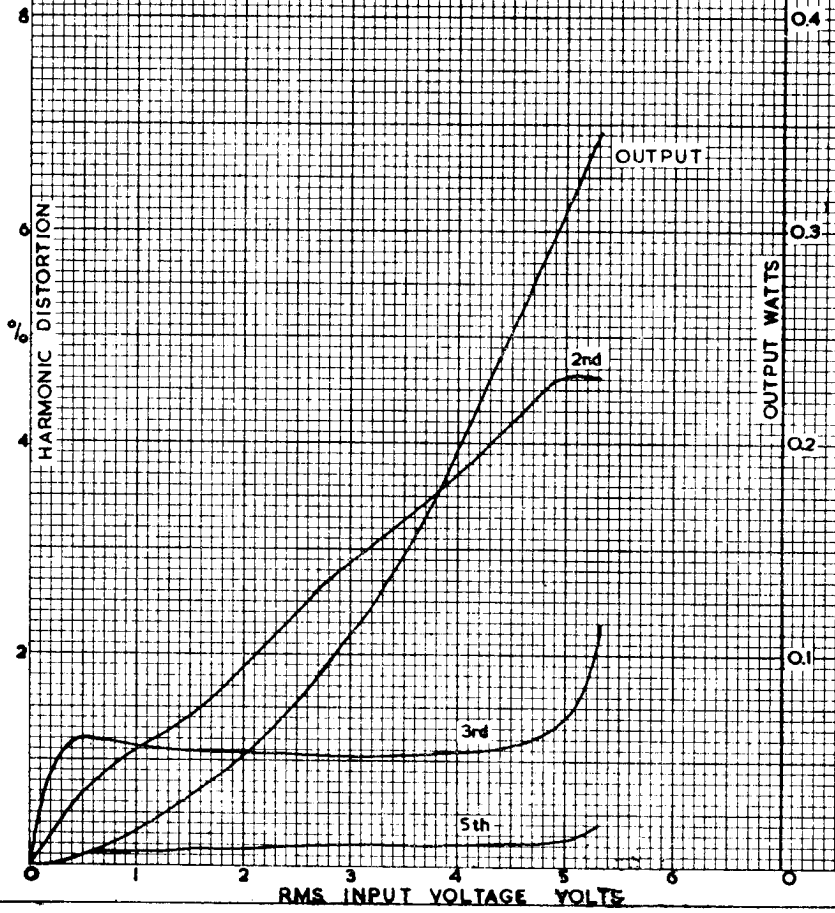
Grid 1 voltage  $V_{g1} = 7.5\text{v}$ .

Anode-Anode Load =  $4000\Omega$ .





BRIMAR 50C5  
CLASS A TRIODE CONNECTION  
Anode voltage  $V_a = 110$  Volts  
Grid 1 voltage  $V_{g1} = -7.5$  Volts  
Load Impedance =  $1000 \Omega$



**BRIMAR 50C5**  
**CLASS A PUSH-PULL**  
**TRIODE CONNECTION**  
 Anode voltage = 110 volts  
 Grid 1 voltage = -7.5 volts  
 Anode-Anode Load = 2000  $\Omega$

