

# **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. |

|              |          |
|--------------|----------|
| <b>Base:</b> | 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> | $C_{g_1, a}$           | 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 |

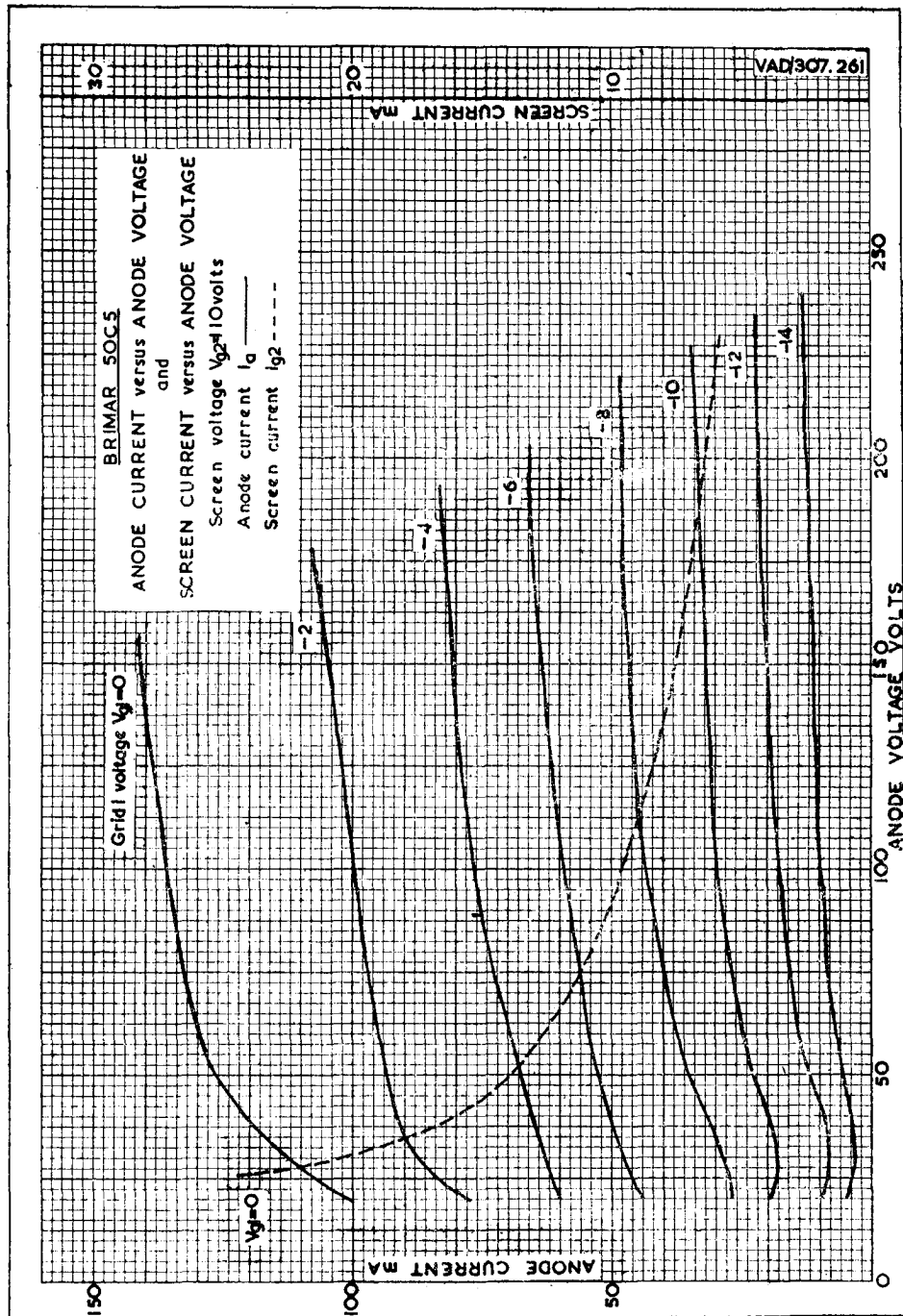
A curve is attached to this report showing the relation between power output, harmonic distortion, and signal input voltage (Curve No. 307.265).

**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).

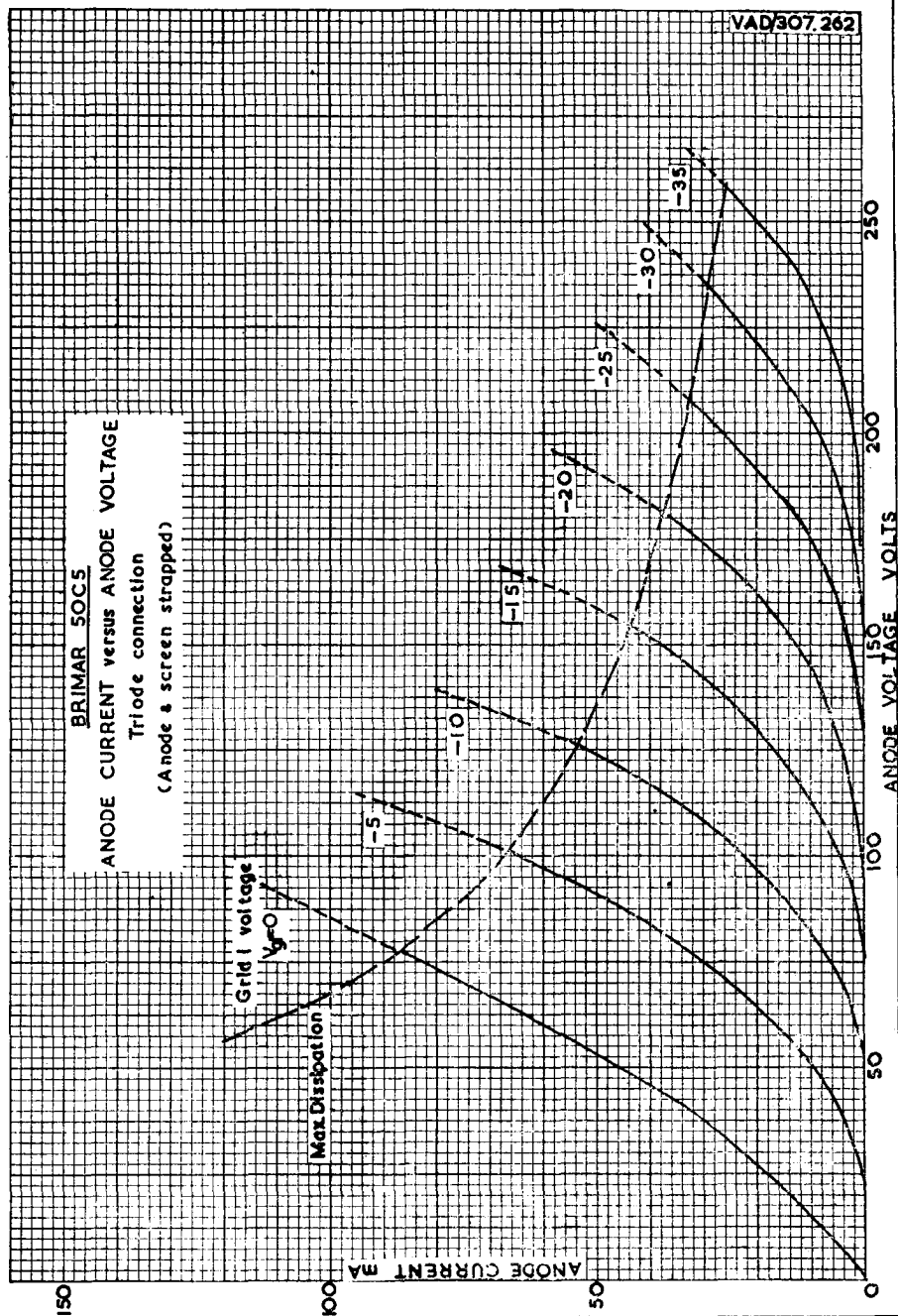


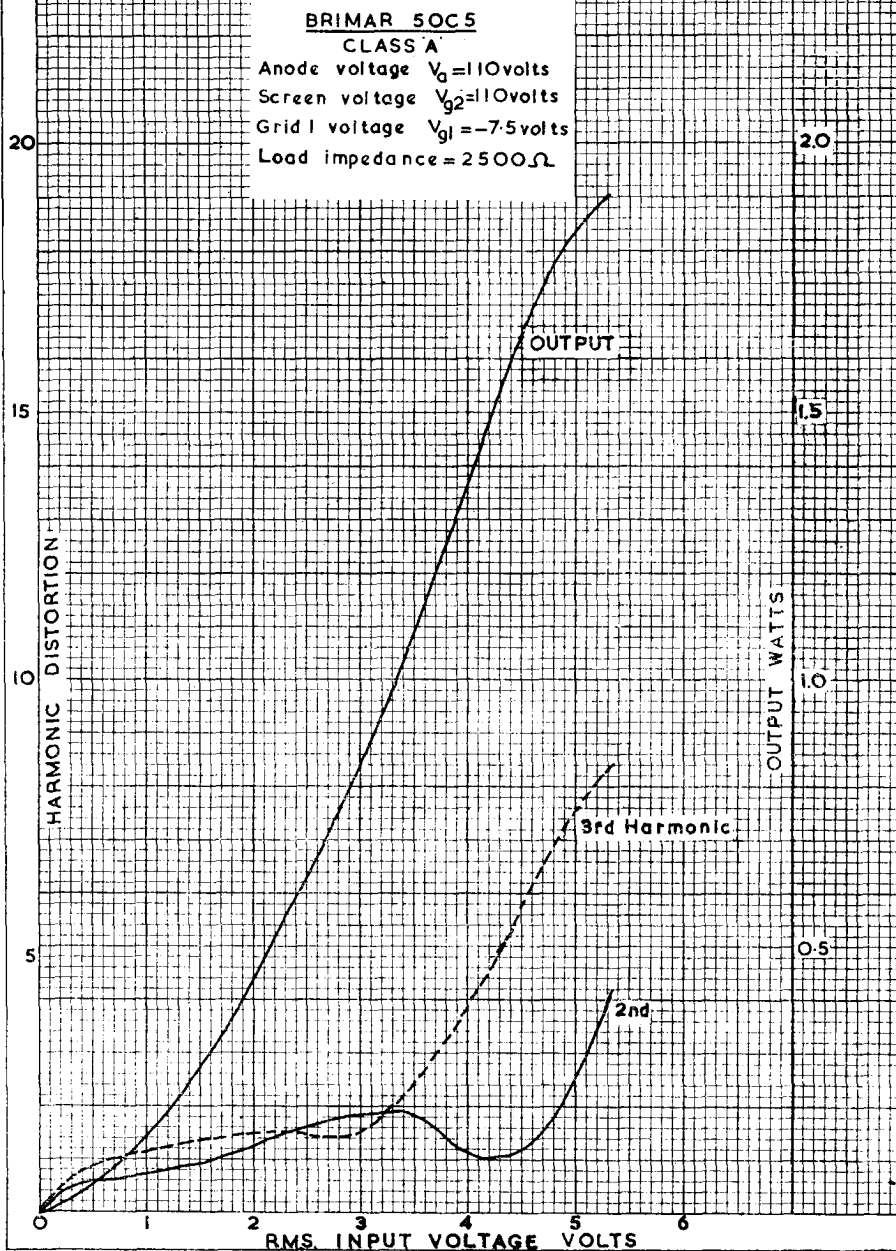
BRIMAR 50C5

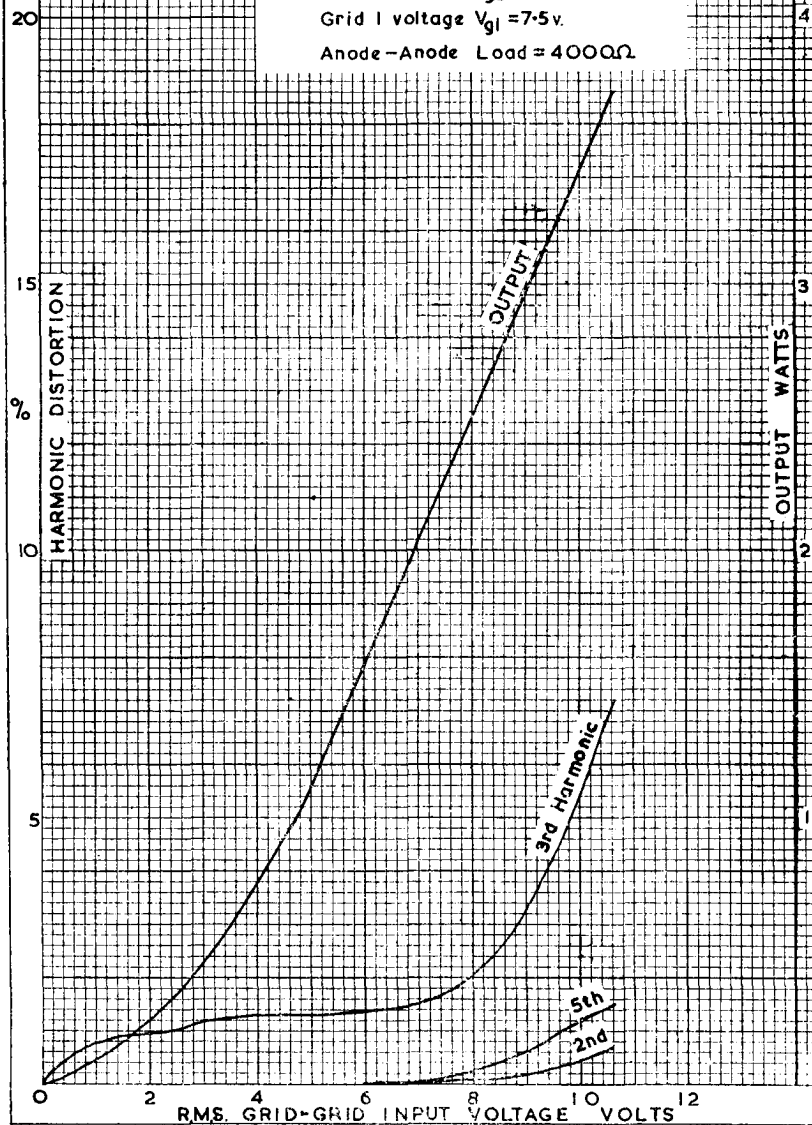
ANODE CURRENT versus ANODE VOLTAGE

Triode connection

(Anode &amp; screen strapped)





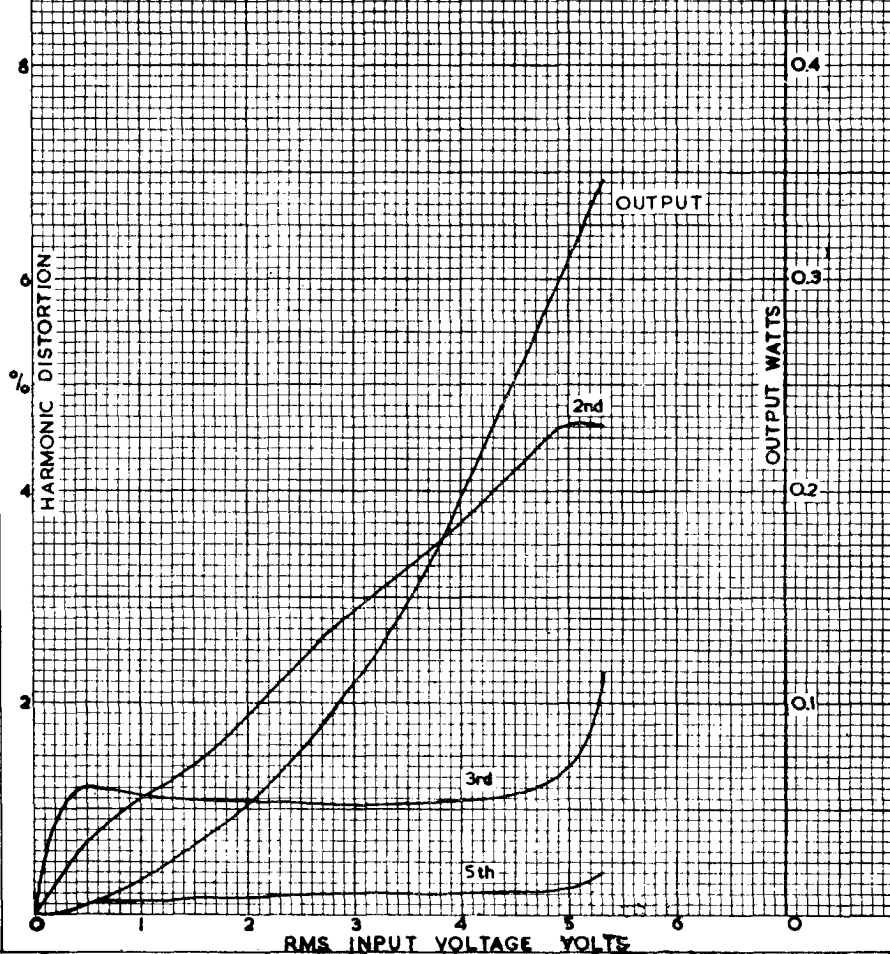
**BRIMAR 50C5****CLASS A PUSH-PULL**Anode voltage  $V_a = 110\text{v}$ .Screen voltage  $V_{g2} = 110\text{v}$ .Grid 1 voltage  $V_{g1} = 7.5\text{v}$ .Anode-Anode Load =  $4000\Omega$ .

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  $\Omega$ 