BRIMAR

RECEIVING VALVE

50C5

APPLICATION REPORT VAD/507.7

Standard Telephones and Cables Limited

FOOTSCRAY, KENT, ENGLAND

**INTRODUCTION:** The Brimar valve type 5OC5 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:**

| Cathode: | 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.

| Max. Diameter | 3/4 in. |
| Max. Seated Height | 2-3/8 ins. |

| Base: | Type B7G |

| Basing Connections: | Pin 1 Cathode and g₃ |
| Pin 2 Control Grid g₁ |
| Pin 3 Heater |
| Pin 4 Heater |
| Pin 5 Control Grid g₁ |
| Pin 6 Screen g₈ |
| Pin 7 Anode |

| Ratings: | Max. Anode Voltage | 135 volts |
| Max. Screen Voltage | 117 volts |
| Max. Anode Dissipation | 5.5 watts |
| Max. Screen Dissipation | 1.25 watts |

| Capacities (approx.,) † | cₜₐₐ | 0.64 pF |
| c Input (c₈n) | 13 pF |
| c Output (c₉₂ₜ) | 6.1 pF |
| ch, 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 (Iₐ/Vₐ) (Curve No. 307-261).

Anode current plotted against anode volts for various values of grid voltage for the valve connected as a triode (Iₐ/Vₐ) (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 (ra): 10,000 ohms
- Mutual Conductance: 7.5 mA/V
- Inner Amplification Factor (μ): 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 (ra): 850 ohms
- Mutual Conductance: 8.2 mA/V
- Amplification Factor (μ): 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):**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Current</td>
<td>0.15 ampere</td>
</tr>
<tr>
<td>Anode Voltage</td>
<td>110 volts</td>
</tr>
<tr>
<td>Grid Voltage</td>
<td>-7.5 volts</td>
</tr>
<tr>
<td>Autobias Resistance</td>
<td>70 ohms</td>
</tr>
<tr>
<td>Anode Current</td>
<td>106 mA</td>
</tr>
<tr>
<td>Output Load (anode-anode)</td>
<td>2000 ohms</td>
</tr>
<tr>
<td>Peak AF Grid Voltage (grid-grid)</td>
<td>15 volts</td>
</tr>
<tr>
<td>Total Harmonic Distortion</td>
<td>2.1%</td>
</tr>
<tr>
<td>Power Output</td>
<td>0.75 watts</td>
</tr>
</tbody>
</table>

_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

CLASS A

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

OUTPUT

HARMONIC DISTORTION

OUTPUT WATTS

1 3rd Harmonic

2nd

RMS INPUT VOLTAGE VOLTS

0 1 2 3 4 5 6
BRIMAR 50CS
CLASS'A' PUSH-PULL
Anode voltage $V_a = 110\text{V}$.
Screen voltage $V_s = 110\text{V}$.
Grid 1 voltage $V_{g1} = 7.5\text{V}$.
Anode-Anode Load = 4000$\Omega$.
BRIMAR 50CS
CLASS A TRIODE CONNECTION
Anode voltage $V_a = 110$ volts
Grid 1 voltage $V_g = -7.5$ volts
Load Impedance = 1000 $\Omega$

HARMONIC DISTORTION

RMS INPUT VOLTAGE VOLTS

OUTPUT

2nd
3rd
5th

0.1
0.2
0.3
0.4

0
1
2
3
4
5
6

OUTPUT WATTS
BRIMAR 50CS
CLASS A PUSH-PULL
TRIODE CONNECTION
Anode voltage = 110 volts
Grid 1 voltage = -7.5 volts
Anode-Anode Load = 2000 ohms

Harmonic Distortion

Output

3rd

2nd

5th

RMS. GRID-GRID INPUT VOLTAGE VOLTS

OUTPUT WATTS

Output

0.8

0.6

0.4

0.2

0.8

0.6

0.4

0.2

VAD 307266