**TETRODE POWER AMPLIFIER OSCILLATOR**

The RK-39 and RK-41 are heater type aligned grid beam power amplifier tubes having isolated line bases. The use of aligned grids reduces the ratio of screen current to plate current and allows more efficient utilization of the total space current. The deflector plates in the RK-39 and RK-41 are connected internally to the cathode.

### HEATER RATING

- **Heater Volt:** 6.3 volts
- **Heater Cur:** 2.5 ma

### DIRECT INTERELECTRODE CAPACITANCES

| Component |
|-----------------|-----------------|
| Grid to Plate | 0.2 μf |
| Input, Output | 13 μf |

### R-F POWER AMP. OR OSC.—CLASS C

#### MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-C Plate Voltage</td>
<td>600 volts</td>
</tr>
<tr>
<td>D-C Screen Voltage</td>
<td>300 volts</td>
</tr>
<tr>
<td>D-C Plate Current (Carrier)</td>
<td>93 ma</td>
</tr>
<tr>
<td>Plate Dissipation (Carrier)</td>
<td>3.5 watts</td>
</tr>
</tbody>
</table>

#### TYPICAL OPERATION

- **D-C Plate Voltage:**
  - Telephone: 600 volts
  - Modulation: 500 volts
- **D-C Screen Voltage:**
  - Telephone: 250 volts
  - Modulation: 250 volts
- **D-C Plate Current:**
  - Telephone: 60 ma
  - Modulation: 30 ma
- **Screen Dissipation:**
  - Telephone: 25 watts
  - Modulation: 15 watts

### OPERATING NOTES

**FREQUENCY RANGE**

The RK-39 and RK-41 may be operated at the maximum ratings at frequencies up to 60 megacycles. Above 60 megacycles the reduced efficiency realized requires that the plate voltage be lowered to a maximum of 300 volts to prevent the plate dissipation from exceeding the maximum rated value. The operation of the tubes at frequencies higher than 120 megacycles is not recommended.

**EXCITATION**

The Class C amplifier characteristic curves show the power output, plate current and screen current plotted vs. excitation as denoted by the d-c control grid current in milliamperes. The power output flattens off around 3 or 4 ma. of grid current with very little gain above these values. The screen dissipation increases with excitation and for this reason the excitation should be kept at a reasonable value.

**SHELDING**

Shielding of the grid input tuning system from the plate tuning apparatus is desirable and will provide improved stability. If a shield is applied to the RK-39 or RK-41 it should extend from the lower internal shield and should clear the glass bulb by at least 1/16 in. or 1.57 mm.

**BIAS**

A minimum bias of 25 volts to 60 volts should be applied to the grid to ensure good frequency response. Additional bias may be obtained by the use of a grid or cathode resistor.

**CRYSTAL OSCILLATOR**

When the RK-39 or RK-41 is used as a crystal controlled oscillator, a 10000 ohm grid leak and a 400 ohm cathode resistor are recommended. At the lower frequencies, it may be necessary to increase the grid to plate capacitance in order to start the oscillator. An additional capacitance of 2 μf should be sufficient. Larger values will cause excessive feedback and may damage the crystal.

**PLATE TEMPERATURE**

The plate of the RK-39 or RK-41 may not show color when operated at the maximum rated plate dissipation. Dissipation above the rated value should be avoided.

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**R-F POWER AMPLIFIER—CLASS B—TELEPHONE**

#### MAXIMUM RATINGS

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<tr>
<td>D-C Plate Voltage</td>
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<td>D-C Screen Voltage</td>
<td>300 volts</td>
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<td>93 ma</td>
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<tr>
<td>Plate Dissipation (Carrier)</td>
<td>3.5 watts</td>
</tr>
</tbody>
</table>

#### TYPICAL OPERATION

- **D-C Plate Voltage:**
  - Telephone: 600 volts
  - Modulation: 500 volts
- **D-C Screen Voltage:**
  - Telephone: 250 volts
  - Modulation: 150 volts
- **D-C Plate Current:**
  - Telephone: 60 ma
  - Modulation: 30 ma
- **Screen Dissipation:**
  - Telephone: 25 watts
  - Modulation: 15 watts

*At the peak of the a-f cycle with 100% modulation.*

---

**R-F POWER AMPLIFIER—CLASS C**

#### PLATE MODULATION

- **E2 = 2.5 volts**
- **E3 = 6.3 volts**
- **E4 = 400 volts**
- **E5 = 2000 volts**

#### PLATE EFFICIENCY

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-C Plate Current</td>
<td>600 ma</td>
</tr>
<tr>
<td>Operating Point</td>
<td>28%</td>
</tr>
</tbody>
</table>

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**R-F POWER AMPLIFIER—CLASS C**

#### CONTROL GRID MODULATION

- **E1 = 2.5 volts**
- **E2 = 6.3 volts**
- **E3 = 400 volts**
- **E4 = 1500 volts**

#### CONTROL GRID EFFICIENCY

<table>
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<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>D-C Screen Current</td>
<td>50 ma</td>
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**R-F POWER AMPLIFIER—CLASS C**

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<tr>
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**R-F POWER AMPLIFIER—CLASS C**

#### CONTROL GRID MODULATION

- **E1 = 2.5 volts**
- **E2 = 6.3 volts**
- **E3 = 400 volts**
- **E4 = 1500 volts**

#### CONTROL GRID EFFICIENCY

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**R-F POWER AMPLIFIER—CLASS C**

#### PLATE EFFICIENCY

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**R-F POWER AMPLIFIER—CLASS C**

#### CONTROL GRID MODULATION

- **E1 = 2.5 volts**
- **E2 = 6.3 volts**
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- **E4 = 1500 volts**

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