Beam Power Tube

FORCED-AIR COOLED  GROUNDED-GRID TYPE

GENERAL DATA

Electrical:
Filament, Multistrand Thoriated Tungsten:
Excitation: DC or Single Phase AC
Voltage (AC or DC): 6.0 volts
Current: 285 amp
Cold Resistance: 0.0025 ohms
Amplification Factor: 32
Direct Interelectrode Capacitances (Approx.):
- Grid to plate: 34.0 pf
- Grid to filament: 60.0 pf
- Plate to filament: 1.0 pf

Mechanical:
Operating Position: Vertical, filament end up
Maximum Overall Length: 17-3/8"
Maximum Diameter: 14-1/4"
Weight (Approx.): 85 lbs
Radiator: Integral part of tube
Mounting: Special
Terminal Diagram (See Dimensional Outline):

F - Filament
G - Grid
P - Plate

Thermal:
Air Flow:
- Upward through radiator: 1000 min. cfm
  The specified air flow at a pressure of 2.1 inches of water
  should be delivered by a blower vertically upward through the
  radiator before and during the application of any voltages.
- To filament seals: 10 cfm
  The specified air flow must be directed into the filament
  header before and during the application of any voltages in
  order to limit the temperature of the filament and grid seals
  to the maximum value.
- Incoming Air Temperature: 45 max. °C
- Radiator Temperature: 210 max. °C
- Bulb Temperature: 180 max. °C
- Seal Temperature (Filament, grid, and plate): 165 max. °C

-= Indicates a change.
AF POWER AMPLIFIER and MODULATOR — Class B

Maximum CCS\(^a\) Ratings, Absolute-Maximum Values:

- DC PLATE VOLTAGE: \(11500\) max. volts
- MAX.-SIGNAL DC PLATE CURRENT\(^b\): \(4\) max. amp
- MAX.-SIGNAL PLATE INPUT\(^b\): \(40\) max. kw
- PLATE DISSIPATION\(^b\): \(17.5\) max. kw

Typical Operation:

Values are for 2 tubes

- DC Plate Voltage: \(10500\) volts
- DC Grid Voltage: \(-250\) volts
- Peak AF Grid-to-Grid Voltage: \(1310\) volts
- Zero-Signal DC Plate Current: \(1.7\) amp
- Max.-Signal DC Plate Current: \(7\) amp
- Effective Load Resistance (plate to plate): \(3300\) ohms
- Max.-Signal Driving Power (Approx.): \(1500\) watts
- Max.-Signal Power Output (Approx.): \(50\) kw

PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1

Maximum CCS\(^a\) Ratings, Absolute-Maximum Values:

- DC PLATE VOLTAGE: \(9000\) max. volts
- DC GRID VOLTAGE: \(-2000\) max. volts
- DC PLATE CURRENT: \(3.2\) max. amp
- DC GRID CURRENT: \(0.65\) max. amp
- PLATE INPUT: \(26\) max. kw
- PLATE DISSIPATION: \(11.5\) max. kw

Typical Operation in Grounded-Filament Circuit:

- DC Plate Voltage: \(8000\) volts
- DC Grid Voltage:\(^c\)
  - From a grid resistor of:
    - \(1280\) ohms: \(-650\) volts
- Peak RF Grid Voltage: \(1100\) volts
- DC Plate Current: \(2.5\) amp
- DC Grid Current (Approx.): \(0.51\) amp
- Driving Power (Approx.): \(510\) watts
- Power Output (Approx.): \(15.8\) kw

Typical Operation in Grounded-Grid Circuit:

Same values as for Grounded-Filament Circuit with the following exceptions:

- Driving Power (Approx.): \(3000\) watts
- Power Output (Approx.): \(18\) kw
RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy

Maximum CCS\(^a\) Ratings, Absolute-Maximum Values:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC PLATE VOLTAGE</td>
<td>11500 max. volts</td>
</tr>
<tr>
<td>DC GRID VOLTAGE</td>
<td>-2000 max. volts</td>
</tr>
<tr>
<td>DC PLATE CURRENT</td>
<td>4 max. amp</td>
</tr>
<tr>
<td>DC GRID CURRENT</td>
<td>0.65 max. amp</td>
</tr>
<tr>
<td>PLATE INPUT</td>
<td>40 max. kw</td>
</tr>
<tr>
<td>PLATE DISSIPATION</td>
<td>17.5 max. kw</td>
</tr>
</tbody>
</table>

Typical Operation in Grounded-Filament Circuit:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Plate Voltage</td>
<td>10000 11000 volts</td>
</tr>
<tr>
<td>DC Grid Voltage</td>
<td>860 ohms. -500 volts</td>
</tr>
<tr>
<td></td>
<td>900 ohms. -540 volts</td>
</tr>
<tr>
<td>From a grid resistor of:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>125 ohms. -500 volts</td>
</tr>
<tr>
<td></td>
<td>130 ohms. -540 volts</td>
</tr>
<tr>
<td>From a cathode resistor of:</td>
<td></td>
</tr>
<tr>
<td>Peak RF Grid Voltage</td>
<td>1000 1050 volts</td>
</tr>
<tr>
<td>DC Plate Current</td>
<td>3.5 3.6 amp</td>
</tr>
<tr>
<td>DC Grid Current (Approx.)(^d)</td>
<td>0.58 0.61 amp</td>
</tr>
<tr>
<td>Driving Power (Approx.)(^d)</td>
<td>515 575 watts</td>
</tr>
<tr>
<td>Power Output (Approx.)</td>
<td>25 29.5 kw</td>
</tr>
</tbody>
</table>

Typical Operation in Grounded-Grid Circuit:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving Power (Approx.)</td>
<td>3400 3750 watts</td>
</tr>
<tr>
<td>Power Output (Approx.)</td>
<td>28 32.5 kw</td>
</tr>
</tbody>
</table>

\(^a\) Continuous Commercial Service.
\(^b\) Averaged over any audio-frequency cycle of sine-wave form.
\(^c\) Obtained from a fixed supply, grid resistor, or a combination of both.
\(^d\) For effect of load resistance on grid current and driving power, refer to TUBE RATINGS — Grid Current and Driving Power in the General Section.
\(^e\) Carrier power of driver modulated 100 per cent.
\(^f\) Key-down conditions per tube without amplitude modulation. Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.
\(^g\) Obtained from a fixed supply, a cathode resistor, a grid resistor, or from a combination of a fixed supply and self-bias.
## Maximum Ratings vs Operating Frequency

<table>
<thead>
<tr>
<th>Operating Frequency (Mc)</th>
<th>Maximum Permissible Percentage of Maximum-Rated Plate Voltage &amp; Plate Input</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Telephony</td>
</tr>
<tr>
<td></td>
<td>Class B, Class C Grid or Suppressor Modulated</td>
</tr>
<tr>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>50</td>
<td>93</td>
</tr>
<tr>
<td>75</td>
<td>87</td>
</tr>
<tr>
<td>100</td>
<td>80</td>
</tr>
</tbody>
</table>
ALL DIMENSIONS IN INCHES

NOTE: FLEXIBLE CONNECTIONS ARE REQUIRED.
# Cooling Requirements

**E_p = 6 Volts**

**Maximum Radiator Temperature = 180°C**

<table>
<thead>
<tr>
<th>CURVE</th>
<th>Pressure Drop Inches of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.74</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>1.65</td>
</tr>
<tr>
<td>E</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Curves taken according to NAFM® Standards—Bulletin No. 103

*National Association of Fan Mfrs.,
General Motors Bldg., Detroit, Mich.

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**Diagram Description:**

- **Radiator Temperature Rise Above Ambient Temperature** vs. **Plate Dissipation-Kilowatts**
- Various lines indicate different radiator temperature rises above ambient temperature for different plate dissipations.
AVERAGE FILAMENT CHARACTERISTIC

COLD RESISTANCE OF FILAMENT = 0.0025 OHM