Power Triode

WATER AND FORCED-AIR COOLED

<table>
<thead>
<tr>
<th>GENERAL DATA</th>
<th>GROUNDED-GRID TYPE</th>
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</thead>
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**Electrical:**

- Filament, Multistrand Thoriated-Tungsten:
  - Voltage (AC or DC) ............. 11 ± 0.6 volts
  - Current at filament volts = 11 .... 285 amp
- Starting Current: It is not necessary to provide means for limiting filament starting current on this type. Full rated filament voltage can be applied safely to the cold filament.
  - Minimum Heating Time ............ 15 sec
  - Amplification Factor ........... 40
- Direct Interelectrode Capacitances
  (Approx.):
  - Grid to plate .................. 53 pf
  - Grid to filament ................. 89 pf
  - Plate to filament ................ 1.2 pf

**Mechanical:**

- Operating Position .............. Vertical, filament end up
- Maximum Overall Length .......... 24-1/2"
- Maximum Diameter ................. 9-1/2"

Terminal Diagram (See *Dimensional Outline*):

- **F**-Filament
- **G**-Grid
- **P**-Plate

**Thermal:**

- Water Flow ...................... 20 to 25 gpm
  - The specified water flow must start before the application of any voltages, and may be removed simultaneously with the filament and plate power.
- Air Flow:
  - To plate seal and bulb:
    - At frequencies below 1.7 Mc ............. Natural
    - At frequencies above 1.7 Mc ............ Up to 250 cfm
  - Adequate forced-air cooling should be provided to limit the temperature of the plate seal and bulb to their specified maximum values. The amount of air flow required will increase with the operating frequency. The cooling air should start before the application of any voltages and should be distributed uniformly around the plate seal by means of a suitable air manifold and an air deflector. The airflow may be removed simultaneously with filament and plate power.

*Indicates a change.*
To filament seals and grid seal ........ 10 min. cfm
The specified air flow should be directed vertically
from a 1-1/4" diameter nozzle into the filament heater
before and during the application of any voltages. It
may be removed simultaneously with filament and plate
power.
Outlet Water Temperature .................. 70 max. °C
Bulb Temperature .......................... 180 max. °C
Seal Temperature (Filament, grid, and plate) ... 165 max. °C

AF POWER AMPLIFIER & MODULATOR — Class B

Maximum CCS\textsuperscript{a} Ratings, Absolute-Maximum Values:

\begin{align*}
\text{DC PLATE VOLTAGE} & : 15000 \text{ max. volts} \\
\text{MAX.-SIGNAL DC PLATE CURRENT}\textsuperscript{b} & : 6 \text{ max. amp} \\
\text{Max.-SIGNAL PLATE INPUT}\textsuperscript{b} & : 90 \text{ max. kw} \\
\text{PLATE DISSIPATION}\textsuperscript{b} & : 50 \text{ max. kw}
\end{align*}

Typical Push-Pull Operation:

Values are for 2 tubes

\begin{align*}
\text{DC Plate Voltage} & : 10200 \quad 15000 \text{ volts} \\
\text{DC Grid Voltage} & : -220 \quad -320 \text{ volts} \\
\text{Peak AF Grid-to-Grid Voltage} & : 900 \quad 1560 \text{ volts} \\
\text{Zero-Signal DC Plate Current} & : 0.6 \quad 0.6 \text{ amp} \\
\text{Max.-Signal DC Plate Current} & : 5.8 \quad 12 \text{ amp} \\
\text{Effective Load Resistance} \quad \text{(Plate to plate)} & : 3600 \quad 2640 \text{ ohms} \\
\text{Max.-Sig. Driving Power (Approx.)}\textsuperscript{c} & : 120 \quad 688 \text{ watts} \\
\text{Max.-Sig. Power Output (Approx.)} & : 37 \quad 117 \text{ kw}
\end{align*}

PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony

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

Maximum CCS\textsuperscript{a} Ratings, Absolute-Maximum Values:

\begin{align*}
\text{DC PLATE VOLTAGE} & : 12500 \text{ max. volts} \\
\text{DC GRID VOLTAGE} & : -2000 \text{ max. volts} \\
\text{DC PLATE CURRENT} & : 5.0 \text{ max. amp} \\
\text{DC GRID CURRENT} & : 1.25 \text{ max. amp} \\
\text{PLATE INPUT} & : 60 \text{ max. kw} \\
\text{PLATE DISSIPATION} & : 33 \text{ max. kw}
\end{align*}

Typical Operation:

\begin{align*}
\text{DC Plate Voltage} & : 10200 \quad 12500 \text{ volts} \\
\text{DC Grid Voltage}\textsuperscript{d} & : \\
\text{From a fixed-supply} & : -1500 \quad -1500 \text{ volts} \\
\text{From a grid resistor of 2100 ohms} & : -1500 \quad - \text{ volts} \\
\text{From a grid resistor of 1400 ohms} & : - \quad -1500 \text{ volts} \\
\text{Peak RF Grid Voltage} & : 2070 \quad 2180 \text{ volts} \\
\text{DC Plate Current} & : 3.3 \quad 4.5 \text{ amp} \\
\text{DC Grid Current (Approx.)}\textsuperscript{e} & : 0.72 \quad 1.1 \text{ amp} \\
\text{Driving Power (Approx.)}\textsuperscript{e} & : 1350 \quad 2160 \text{ watts} \\
\text{Power Output (Approx.)} & : 28 \quad 45 \text{ kw}
\end{align*}
RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy

Maximum CCC Ratings, Absolute-Maximum Values:

- DC PLATE VOLTAGE: 17000 max. volts
- DC GRID VOLTAGE: -2000 max. volts
- DC PLATE CURRENT: 9 max. amp
- DC GRID CURRENT: 1.25 max. amp
- PLATE INPUT: 150 max. kw
- PLATE DISSIPATION: 50 max. kw

Typical Operation in Grounded-Filament Circuit:

- DC Plate Voltage: 14000 17000 volts
- DC Grid Voltage:
  - From a fixed supply: -900 -1450 volts
  - From a cathode resistor of 125 ohms: -900 volts
  - From a cathode resistor of 150 ohms: -1450 volts
  - From a grid resistor of 750 ohms: -900 volts
  - From a grid resistor of 1320 ohms: -1450 volts
- Peak RF Grid Voltage: 1600 2375 volts
- DC Plate Current: 6 8.5 amp
- DC Grid Current (Approx.): 1.2 1.1 amp
- Driving Power (Approx.): 1700 2300 watts
- Power Output (Approx.): 65 105 kw

Typical Operation in Grounded-Grid Circuit:

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

- Driving Power (Approx.): 6250 11200 watts
- Power Output: 70 114 kw

a Continuous Commercial Service.
b Averaged over any audio-frequency cycle of sine-wave form.
c The driving stage should have good regulation and should be capable of supplying considerably more than the specified driving power.
d Obtained from a fixed supply, grid resistor, or a combination of both.
e For effect of load resistance on grid current and driving power, refer to TUBE RATINGS—Grid Current and Driving Power in the General Section.
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.

CHARACTERISTICS RANGE VALUES

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Note</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament Current</td>
<td></td>
<td>1</td>
<td>265</td>
</tr>
<tr>
<td>Amplification Factor</td>
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<td>1.2</td>
<td>35</td>
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<tr>
<td>Grid-Plate Capacitance</td>
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<td>1.5</td>
<td>45</td>
</tr>
<tr>
<td>Grid-Filament Capacitance</td>
<td></td>
<td>47</td>
<td>59</td>
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<tr>
<td>Plate-Filament Capacitance</td>
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<td>74</td>
<td>104</td>
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<tr>
<td>Grid Voltage</td>
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<tr>
<td>Plate Voltage</td>
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<tr>
<td>Plate Voltage</td>
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<tr>
<td>Peak Cathode Current</td>
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<td>50</td>
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<tr>
<td>Useful Power Output</td>
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<td>1.7</td>
<td>80</td>
</tr>
</tbody>
</table>

Indicates a change.
Note 1: With 11 volts ac on filament.

Note 2: With dc grid voltage of −50 volts, and with plate voltage adjusted to give dc plate current of 2 amperes.

Note 3: With dc plate voltage of 15000 volts, and with grid voltage adjusted to give dc plate current of 0.05 ampere.

Note 4: With dc grid voltage of −100 volts, and with plate voltage adjusted to give a dc plate current of 2 amperes.

Note 5: With dc grid voltage of 0 volts, and with plate voltage adjusted to give dc plate current of 2 amperes.

Note 6: Represents the maximum usable cathode current (plate current and grid current) for the tube under any condition of operation.

Note 7: With dc plate voltage of 17000 volts, dc plate current of 8.8 amperes, dc grid current of 1.05 to 1.25 amperes, grid resistor of 1600 ± 10% ohms, and frequency of 1.6 Mc.

### Maximum Ratings vs Operating Frequency

<table>
<thead>
<tr>
<th>OPERATING FREQUENCY</th>
<th>MAXIMUM PERMISSIBLE PERCENTAGE OF MAXIMUM-RATED PLATE VOLTAGE &amp; PLATE INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mc</td>
<td>TELEGRAPHY</td>
</tr>
<tr>
<td></td>
<td>Class C Unmodulated</td>
</tr>
<tr>
<td></td>
<td>Plate-Modulated</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>27</td>
<td>88</td>
</tr>
<tr>
<td>35</td>
<td>77</td>
</tr>
</tbody>
</table>

CURVES shown under Type 5671 also apply to the 5770

← Indicates a change.
POWER TRIODE

NOTE: FLEXIBLE CONNECTIONS ARE REQUIRED