The Elmac 304TL is a low-mu, power triode having a maximum plate dissipation rating of 300 watts, and is intended for use as an amplifier, oscillator or modulator, where maximum performance can be obtained at low plate voltage. It can be used at its maximum ratings at frequencies as high as 80-Mc.

Cooling of the 304TL is accomplished by radiation from the plate, which operates at a visible red color at maximum dissipation, and by means of air convection around the envelope.

**GENERAL CHARACTERISTICS**

**ELECTRICAL**
- Filament: Thoriated tungsten
- Voltage
  - 5.0 or 10.0 volts
  - 25.0 or 12.5 amperes
  - 12
- Amplification Factor (Average)
  - Grid-Plate
  - 8.6 $\mu$A
  - Grid-Filament
  - 12.1 $\mu$A
  - Plate-Filament
  - 8.3 $\mu$A
- Transconductance $[I_{g} = 1.0 \text{ amp}, E_{g} = 3000 \text{ v}, e_{g} = -175 \text{v}]$
  - 18,700 $\mu$hos
- Frequency for Maximum Ratings
  - 180 Mc.

**MECHANICAL**
- Base
- Special 4 pin, No. 5008B
- Bezel
- RMA type 4BC
- Mounting
- Vertical, base down or up
- Cooling
- Convection and Radiation
- Recommended Heat Dissipating Connectors:
  - Plate
  - grid
  - HR-7
- Grid
  - HR-6
- Maximum Overall Dimensions:
  - Length: 7.525 inches
  - Diameter: 3.563 inches
  - Net weight: 9 ounces
  - Shipping weight (Average): 2 pounds

**AUDIO FREQUENCY POWER AMPLIFIER AND MODULATOR**

Class B (Sinusoidal wave, two tubes unless otherwise specified)

**MAXIMUM RATINGS**

<table>
<thead>
<tr>
<th>D-C PLATE VOLTAGE</th>
<th>3000 MAX. VOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX SIGNAL D-C PLATE CURRENT PER TUBE</td>
<td>900 MAX. MA.</td>
</tr>
<tr>
<td>PLATE DISSIPATION, PER TUBE</td>
<td>300 MAX. WATTS</td>
</tr>
</tbody>
</table>

**TYPICAL OPERATION, CLASS AB**

<table>
<thead>
<tr>
<th>D-C Plate Voltage</th>
<th>1500 2000 2500 3000 3000 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-C Grid Voltage (approx.)</td>
<td>-118 -170 -230 -290 Volts</td>
</tr>
<tr>
<td>Zero-Signal D-C Plate Current</td>
<td>270 200 160 130 MA.</td>
</tr>
<tr>
<td>Max-Signal D-C Plate Current</td>
<td>572 546 483 444 MA.</td>
</tr>
<tr>
<td>Effective Load, Plate-to-Plate</td>
<td>2540 5300 8500 12,000 Ohms</td>
</tr>
<tr>
<td>Peak A-F Grid Input Voltage (per tube)</td>
<td>-118 170 230 290 Volts</td>
</tr>
<tr>
<td>Max-Signal Peak Driving Power</td>
<td>0 0 0 0 Watts</td>
</tr>
<tr>
<td>Max-Signal Plate Power Output</td>
<td>256 490 610 730 Watts</td>
</tr>
</tbody>
</table>

*Adjust to give stated zero-signal plate current. The effective grid circuit resistance for each tube must not exceed 250,000 ohms.

**TYPICAL OPERATION, CLASS AB**

<table>
<thead>
<tr>
<th>D-C Plate Voltage</th>
<th>1500 2000 2500 3000 3000 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-C Grid Voltage (approx.)</td>
<td>-118 -170 -230 -290 Volts</td>
</tr>
<tr>
<td>Zero-Signal D-C Plate Current</td>
<td>270 200 160 130 MA.</td>
</tr>
<tr>
<td>Max-Signal D-C Plate Current</td>
<td>1140 1000 900 800 MA.</td>
</tr>
<tr>
<td>Effective Load, Plate-to-Plate</td>
<td>2750 4500 6000 9100 Ohms</td>
</tr>
<tr>
<td>Peak A-F Grid Input Voltage (per tube)</td>
<td>-245 290 340 390 Volts</td>
</tr>
<tr>
<td>Max-Signal Peak Driving Power</td>
<td>78 87 95 110 Watts</td>
</tr>
<tr>
<td>Max-Signal Nominal Driving Power (approx.)</td>
<td>-</td>
</tr>
<tr>
<td>Max-Signal Plate Power Output</td>
<td>1100 1400 1650 1800 Watts</td>
</tr>
</tbody>
</table>

*Adjust to give stated zero-signal plate current.

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(Continued on Next Page)
RADIO FREQUENCY POWER AMPLIFIER
AND OSCILLATOR

Class-C Telegraphy or FM Telephony
(Key-down conditions, per tube)

MAXIMUM RATINGS

D-C Plate Voltage - - 3000 MAX. VOLTS
D-C Plate Current - - 900 MAX. MA.
Plate Dissipation - - 300 MAX. WATTS

Grid Dissipation - - 50 MAX. WATTS

TYPICAL OPERATION*

D-C Plate Voltage - - 1500 2000 3000 Volts
D-C Grid Voltage - - 250 300 400 Volts
D-C Plate Current - - 665 600 500 Ma.
D-C Grid Current - - 90 85 80 Ma.
Peak R-F Grid Input Voltage - - 430 480 575 Volts
Driving Power (approx.) - - 33 36 40 Watts
Grid Dissipation - - 11 11 8 Watts
Plate Power Input - - 1000 1200 1500 Watts
Plate Dissipation - - 300 300 300 Watts
Plate Power Output - - 700 900 1200 Watts

*Figures show actual measured tube performance, and do not allow for circuit losses.

Indicates change from sheet dated 1-1-44
DRIVING POWER vs. POWER OUTPUT

The three charts on this page show the relationship of plate efficiency, power output and grid driving power at plate voltages of 1500, 2000 and 3000 volts. These charts show combined grid and bias losses only. The driving power and power output figures do not include circuit losses. The plate dissipation in watts is indicated by $P_p$.

Points A, B, and C are identical to the typical Class C operating conditions shown on the first page under 1500, 2000, and 3000 volts respectively.