The Eimac 250TL is a low-mu triode having a maximum plate dissipation of 250 watts. It is intended for use as an amplifier, oscillator or modulator, and can be used at its maximum ratings at frequencies up to 40 Mc.

Cooling of the 250TL is accomplished by radiation from the plate, which operates at a visible red color at maximum dissipation, and by means of air circulation around the envelope.

**GENERAL CHARACTERISTICS**

**ELECTRICAL**

- **Filament:** Thoriated tungsten
- **Voltage:** 5.0 volts
- **Current:** 10.5 amperes
- **Amplification Factor (Average):** 14
- **Direct Interelectrode Capacitances (Average):**
  - Grid-Plate: 3.0 μf
  - Grid-Filament: 3.7 μf
  - Plate-Filament: 0.7 μf
- **Transconductance (Ih=350 ma, Eb=3000V):** 2650 μmhos
- **Frequency for Maximum Ratings:** 40 Mc

**MECHANICAL**

- **Base:** Medium 4-pin bayonet type, fits E. F. Johnson No. 211 series sockets, National XM-50 socket, or the equivalent.
  - For pin connections, see outline drawing.
- **Mounting:** Vertical, base down or up.
- **Cooling:** Convection and radiation.
- **Recommended Heat Dissipating Connectors:**
  - Plate: Eimac HR-6
  - Grid: Eimac HR-3
- **Maximum Overall Dimensions:**
  - Length: 10.13 inches
  - Diameter: 3.81 inches
  - Net Weight: 10 ounces
  - Shipping Weight: 3 pounds

**AUDIO FREQUENCY POWER AMPLIFIER AND MODULATOR**

- **Class-A8, (Sinusoidal wave, two tubes unless otherwise specified)**
- **MAXIMUM RATINGS**
  - D-C PLATE VOLTAGE: 3000 MAX. VOLTS
  - MAX-SIGNAL D-C PLATE CURRENT, PER TUBE: 350 MAX. MA.
  - MAX-SIGNAL D-C PLATE DISSIPATION, PER TUBE: 250 MAX. WATTS

**RADIO FREQUENCY POWER AMPLIFIER AND OSCILLATOR**

- **Class-C Telegraphy or FM Telephony (Key-down conditions, per tube)**
- **MAXIMUM RATINGS**
  - D-C PLATE VOLTAGE: 4000 MAX. VOLTS
  - D-C PLATE CURRENT: 350 MAX. MA.
  - PLATE DISSIPATION: 250 MAX. WATTS

**TYPICAL OPERATION**

- D-C PLATE Voltage: 3000 to 3500 Volts
- D-C Grid Voltage: 500 to 1000 Volts
- Max-Signal D-C Plate Current: 700 to 800 Ma.
- Effective Load, Plate-to-Plate: 12,000,000 Ohms
- Peak A-F Grid Input Voltage (per tube): 400 Volts
- Max-Signal Peak Driving Power: 12 Watts
- Max-Signal Nominal Driving Power: 8 Watts
- Max-Signal Plate Power Output: 500 Watts

*Adjust for given zero-signal plate current.

**PLATE MODULATED RADIO FREQUENCY POWER AMPLIFIER**

- **Class-C Telegraphy (Carrier conditions, per tube)**
- **MAXIMUM RATINGS**
  - D-C PLATE VOLTAGE: 3200 MAX. VOLTS
  - D-C PLATE CURRENT: 200 MAX. MA.
  - PLATE DISSIPATION: 165 MAX. WATTS
  - GRID DISSIPATION: 35 MAX. WATTS

**TYPICAL OPERATION**

- D-C PLATE Voltage: 2000 to 2500 Volts
- D-C Grid Current: 250 to 225 Ma.
- Grid Resistor: 15,000 to 17,500 Ohms
- D-C Grid Supply Voltage: 3000 to 3250 Volts
- Peak A-F Grid Input Voltage: 1200 to 1300 Volts
- Max-Signal Driving Power: 12 Watts
- Grid Dissipation: 14 Watts
- Plate Power Input: 600 Watts
- Plate Dissipation: 165 Watts
- Plate Power Output: 415 Watts

*These figures show actual measured tube performance and do not allow for variations in circuit losses.

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APPLICATION

MECHANICAL

Mounting—The 250TL must be mounted vertically, base down or up. The plate and grid leads should be flexible, and the tube must be protected from vibration and shock.

Cooling—Heat Dissipating Connectors (Eimac HR-6 and HR-3 or equivalent) must be used at the plate and grid terminals of the 250TL. Forced-air cooling is not required in properly designed equipment operating at frequencies below 40 Mc. If the free circulation of air around the tube is restricted, a small fan or centrifugal blower should be used to provide additional cooling.

The temperature of the plate and grid seals must not be allowed to exceed 225° C. One method of measuring these temperatures is by the use of "Tempilaq," a temperature-sensitive lacquer manufactured by the Tempil Corporation, 132 W. 22nd St., New York 11, N. Y.

ELECTRICAL

Filament Voltage—The filament voltage, as measured directly at the tube, should be 5.0 volts with maximum allowable variations due to line fluctuations from 5.25 to 4.75 volts.

Bias Voltage—When grid-leak bias is used, suitable protective means must be provided to prevent excessive plate dissipation in the event of loss of excitation, and the grid-leak resistor should be made adjustable to facilitate maintaining the bias voltage and plate current at the desired value from tube to tube.

Grid Dissipation—The power dissipated by the grid of the 250TL must not exceed 40 watts. Grid dissipation may be calculated from the following expression.

\[
P_g = e_{cmp}I_g
\]

where \( P_g \) = grid dissipation,
\( e_{cmp} \) = peak positive grid voltage, and
\( I_g \) = d-c grid current

\( e_{cmp} \) may be measured by means of a suitable peak-reading voltmeter connected between filament and grid. In equipment in which the plate loading varies widely, such as oscillators used for radio-frequency heating, care should be taken to make certain that the grid dissipation does not exceed the maximum rating under any condition of loading.

Plate Dissipation—The plates of the 250TL operate at a visibly red color at the maximum rated dissipation of 250 watts. Plate dissipation in excess of the maximum rating is permissible only for short periods of time, such as during tuning procedures.

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1For suitable peak v.t.v.m. circuits see, for instance, "Vacuum Tube Ratings." Eimac News, January, 1945. This article is available in reprint form on request.

Indicates change from sheet dated 4-1-51.
DRIVING POWER vs. POWER OUTPUT

The three charts on this page show the relationship of plate efficiency, power output and approximate grid driving power at plate voltages of 2000, 3000 and 4000 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 2000, 3000, and 4000 volts respectively.