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 Inter-electrode Capacitances (Average):
  - Grid-Plate: 3.0 μf
  - Grid-Filament: 3.7 μf
  - Plate-Filament: 0.7 μf
- Transconductance (I_b = 350 ma, E_0 = 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.
- Mounting: Vertical, base down or up.
- Cooling: Convection and radiation.
- Recommended Heat-Dissipating Connectors:
  - Plate: Eimac HR-6
  - Grid: Eimac HR-3
- Maximum Over-all Dimensions:
  - Length: 10.13 inches
  - Diameter: 3.81 inches
  - Net Weight: 10 ounces
  - Shipping Weight: 3 pounds

**AUDIO FREQUENCY POWER AMPLIFIER AND MODULATOR**

- **Class-AB, (Sinusoidal wave, two tubes unless otherwise specified)**
- **MAXIMUM RATINGS**
  - D-C Plate Voltage: 4000 MAX. VOLTS
  - Max-Signal D-C Plate Current, per tube: 350 MAX. MA.
  - Max-Signal 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.
  - Grid Dissipation: 35 MAX. WATTS

**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: 280 MAX. MA.
  - Plate Dissipation: 165 MAX. WATTS
  - Grid Dissipation: 35 MAX. WATTS

**TYPICAL OPERATION**
- D-C Plate Voltage: 2000 3000 4000 Volts
- D-C Grid Voltage: 200 350 500 Volts
- D-C Plate Current: 320 350 500 MA.
- Peak R-F Grid Input Voltage (approx.) 750 900 Volts
- Grid Dissipation (approx.) 14 15 16 Watts

**TYPICAL OPERATION, per tube** (Frequencies up to 40 Mc)
- D-C Plate Voltage: 2000 3000 4000 Volts
- D-C Grid Voltage: 200 350 500 Volts
- D-C Plate Current: 320 350 500 MA.
- Peak R-F Grid Input Voltage (approx.) 750 900 Volts
- Grid Dissipation (approx.) 14 15 16 Watts
- Power Input: 700 1000 1250 Watts
- Plate Dissipation: 245 250 250 Watts
- Power Output: 455 750 1000 Watts

**TYPICAL OPERATION, per tube** (Frequencies up to 40 Mc)
- D-C Plate Voltage: 2000 2500 3000 Volts
- D-C Grid Voltage: 200 250 200 MA.
- Total D-C Bias Voltage: 620 620 620 Volts
- Grid Resistor: 13,000 15,000 17,500 Ohms
- Fixed D-C Bias Supply Voltage: 180 220 264 Volts
- D-C Grid Current: 29 29 29 MA.
- Peak R-F Grid Input Voltage: 680 795 795 Volts
- Grid Dissipation (approx.) 9 9 9 Watts
- Plate Power Input: 500 645 600 Watts
- Plate Dissipation: 165 165 165 Watts
- Plate Power Output: 335 400 435 Watts

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

If it is desired to operate this tube under conditions widely different from those given under "Typical Operation", possibly exceeding the maximum ratings given for CW service, write Eimac, for information and recommendations.
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 "Templaq," a temperature-sensitive lacquer manufactured by the Tempil Corporation, 11 W. 25th St., New York 10, 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.

\[ P_g = e_{mp} I_c \]

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

\( e_{mp} \) 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.

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