

EL-McCULLOUGH,
SAN BRUNO, CALIFORNIA

MEDIUM MU TRIODE

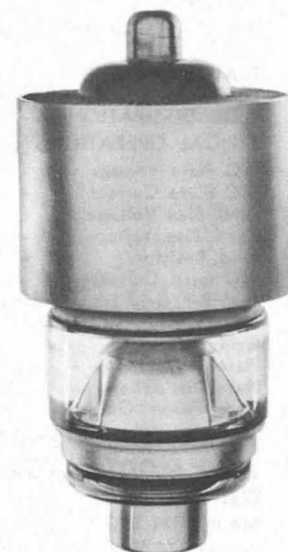
The approved Federal Communications Commission rating for the 3X2500A3 as a plate modulated amplifier is 5000 watts of carrier power.

ELECTRICAL

Frequency for Maximum Ratings - - - - - 75 Mc.

COOLING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Forced Air
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These figures are for an ambient temperature of 20° C at sea level and do not include duct or filter losses.



D-C Plate Voltage	-	-	4000	5000	6000	Volts
D-C Plate Current	-	-	2.5	2.5	2.08	Amps
D-C Grid Voltage	-	-	-300	-450	-500	Volts
D-C Grid Current	-	-	245	265	180	Ma.
Peak R-F Grid Input Voltage	-	-	580	750	765	Volts
Driving Power (approx.)	-	-	142	197	136	Watts
Grid Dissipation	-	-	68	78	46	Watts
Plate Power Input	-	-	10,000	12,500	12,500	Watts
Plate Dissipation	-	-	2500	2500	2500	Watts
Plate Power Output	-	-	7500	10,000	10,000	Watts

D-C Plate Voltage	-	-	-	-	3700	4000	Volts
D-C Grid Voltage	-	-	-	-	-450	-500	Volts
D-C Plate Current	-	-	-	-	1.8	1.85	Amps
D-C Grid Current	-	-	-	-	190	190	Ma.
Driving Power (approx.)	-	-	-	-	1600	1900	Watts
Useful Power Output	-	-	-	-	6850	7500	Watts

PLATE MODULATED RADIO FREQUENCY AMPLIFIER

(Conventional Neutralized Amplifier—Frequencies below 75 Mc.)

Class-C Telephony (Carrier conditions, per tube)

MAXIMUM RATINGS

D-C PLATE VOLTAGE	-	-	-	5000	MAX. VOLTS
D-C PLATE CURRENT	-	-	-	2.0	MAX. AMPS
PLATE DISSIPATION	-	-	-	1670	MAX. WATTS
PLATE COOLER CORE TEMPERATURE	-	-	-	150	MAX. °C
GRID DISSIPATION	-	-	-	150	MAX. WATTS

TYPICAL OPERATIONS (Frequencies below 75 Mc., per tube)

D-C Plate Voltage	-	-	4000	4500	5000	Volts
D-C Plate Current	-	-	1.67	1.55	1.45	Amps
Total Bias Voltage	-	-	—450	—500	—550	Volts
Fixed Bias Voltage	-	-	—230	—325	—410	Volts
Grid Resistor	-	-	1500	1500	1400	Ohms
D-C Grid Current	-	-	150	120	100	Ma.
Peak R-F Grid Input Voltage	-	-	680	720	760	Volts
Driving Power (approx.)	-	-	102	86	76	Watts
Grid Dissipation	-	-	35	26	21	Watts
Plate Power Input	-	-	6670	6970	7250	Watts
Plate Dissipation	-	-	1670	1670	1670	Watts
Plate Power Output	-	-	5000	5300	5580	Watts

AUDIO FREQUENCY POWER AMPLIFIER AND MODULATOR

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

MAXIMUM RATINGS

D-C PLATE VOLTAGE	-	-	-	6000	MAX. VOLTS
MAX-SIGNAL D-C PLATE CURRENT, PER TUBE	-	-	-	2.5	MAX. AMPS
PLATE DISSIPATION, PER TUBE	-	-	-	2500	MAX. WATTS
PLATE COOLER CORE TEMPERATURE	-	-	-	150	MAX. °C

TYPICAL OPERATION CLASS AB₂ (Two tubes)

D-C Plate Voltage	-	-	4000	5000	6000	Volts
D-C Grid Voltage (approx.)*	-	-	—150	—190	—240	Volts
Zero-Signal D-C Plate Current	-	-	0.6	0.5	0.4	Amps
Max-Signal D-C Plate Current	-	-	4.0	3.2	3.0	Amps
Effective Load, Plate to Plate	-	-	2200	3600	4650	Ohms
Peak A-F Grid Input Voltage (per tube)	-	-	340	360	390	Volts
Max-Signal Peak Driving Power	-	-	340	230	225	Watts
Max-Signal Nominal Driving Power (approx.)	-	-	170	115	113	Watts
Max-Signal Plate Power Output	-	-	11,000	11,000	13,000	Watts

*Adjust to give stated zero-signal plate current.

TYPICAL OPERATION CLASS AB₂ (Two tubes)

(Modulator service for 4000 and 5000 volt operation, to modulate one or two tubes, as shown under "Plate Modulated Radio Frequency Amplifier.")

D-C Plate Voltage	-	4000	5000	4000	5000	Volts
D-C Grid Voltage (approx.)*	-	—155	—200	—145	—190	Volts
Zero-Signal D-C Plate Current	-	0.4	0.4	0.6	0.5	Amps
Max-Signal D-C Plate Current	-	1.35	1.13	2.70	2.26	Amps
Effective Load, Plate to Plate	-	6600	10,000	3300	5000	Ohms
Peak A-F Grid Input Voltage (per tube)	-	240	275	285	310	Volts
Max-Signal Peak Driving Power	-	42	40	134	118	Watts
Max-Signal Nominal Driving Power (approx.)	-	21	20	67	59	Watts
Max-Signal Plate Power Output	-	3700	4000	7400	8000	Watts
Will Modulate R. F. Final Input of	-	6670	7250	13,340	14,500	Watts

*Adjust to give stated zero-signal plate current.

APPLICATION

Filament Voltage—The filament voltage, as measured directly at the tube, should be 7.5 volts with maximum allowable variations due to line fluctuation of from 7.12 to 7.87 volts.

Bias Voltage—There is little advantage in using bias voltages in excess of those given under "Typical Operation", except in certain very specialized applications. Where bias is obtained from a grid resistor, suitable protective means must be provided to prevent excessive plate dissipation in the event of loss of excitation.

Plate Voltage—The plate supply voltage for the 3X2500A3 should not exceed 6000 volts. In most cases there is little advantage in using plate-supply voltages higher than those given under "Typical Operation" for the power output desired.

In Class-C FM or Telegraphy service, a 0.1 henry choke, shunted by a spark gap, should be series connected between the plates of the amplifier tubes and the high voltage plate supply capacitor to offer protection from transients and surges. In plate modulated service, where a plate modulation transformer is used, the protective choke is not normally required.

Grid Dissipation—The power dissipated by the grid of the 3X2500A3 must never exceed 150 watts. Grid dissipation may be calculated from the following expression:

$$P_g = e_{cmp} I_c$$

where P_g = Grid dissipation
 e_{cmp} = Peak positive grid voltage, and
 I_c = D-C grid current

e_{cmp} may be measured by means of a suitable peak voltmeter connected between filament and grid. Any suitable peak v.t.v.m. circuit may be used (one is shown in "Vacuum Tube Ratings", Eimac News, January 1945. This article is available, in reprint form on request).

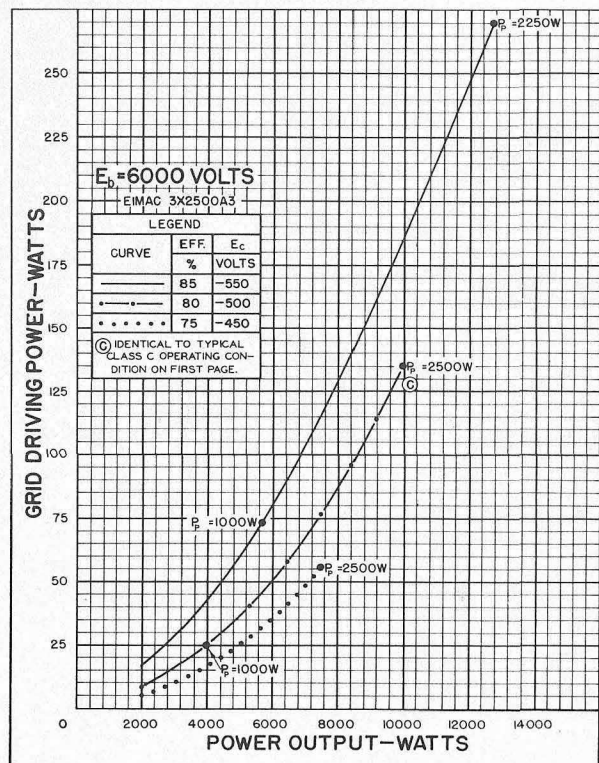
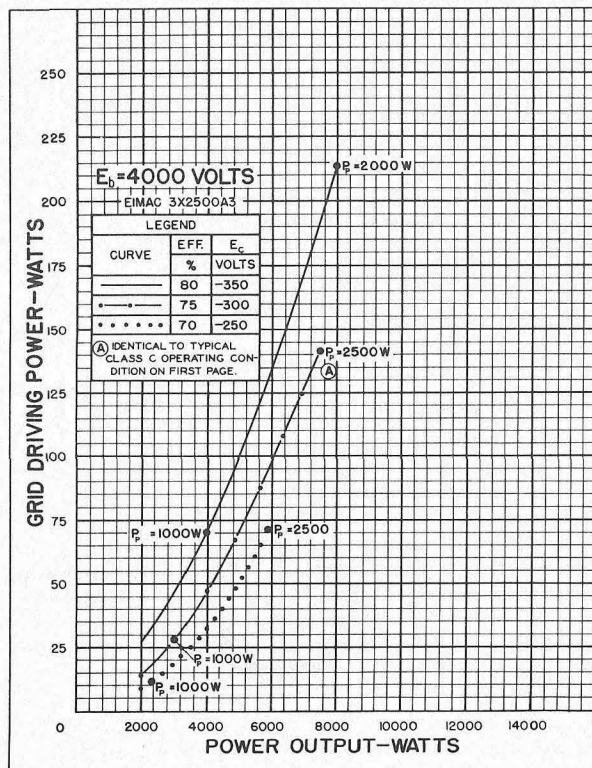
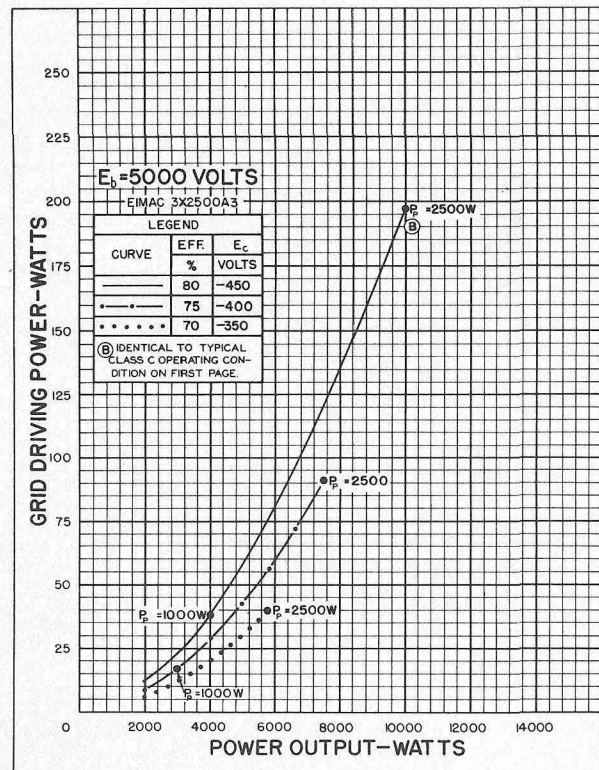
In equipment in which the plate loading varies widely, such as oscillators used for radio-frequency heating, care should be taken to make certain that the grid dissipation does not exceed the maximum rating under any condition of loading.

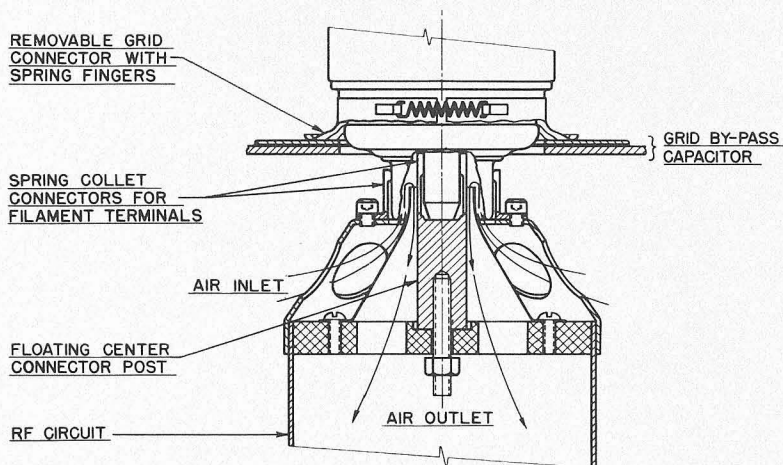
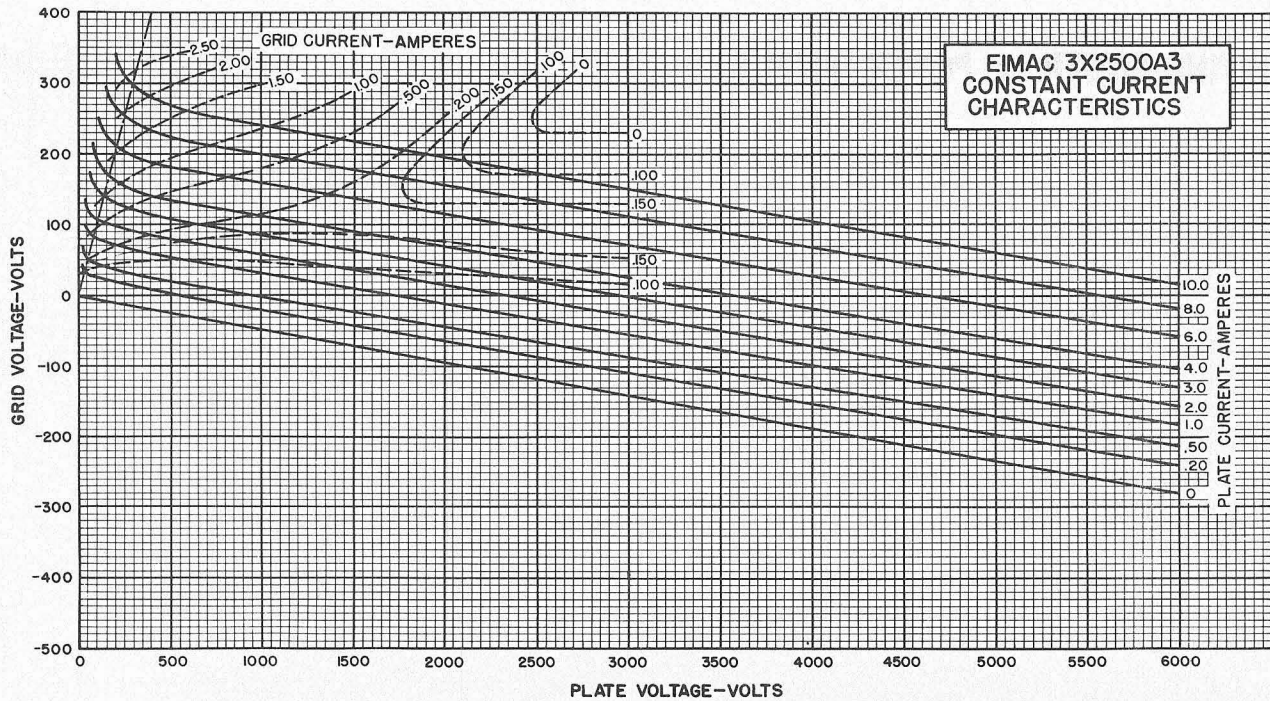
In VHF operation, particularly above 75 Mc., the d-c grid current must not exceed 200 ma. under any conditions of plate loading. With lightly loaded conditions the grid driving-power should be reduced so that the grid current does not exceed one-tenth of the plate current.

► 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 4000, 5000 and 6000 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 4000, 5000 and 6000 volts respectively.





TYPICAL TUBE CONNECTORS AND STEM COOLING

