Western Electric

245A Vacuum Tube

Classification—Voltage-amplifier, screen-grid tetrode with indirectly heated cathode

Applications

Carrier-frequency and radio-frequency voltage amplifier.
Detector.
Audio-frequency voltage amplifier.

Dimensions—Dimensions, outline diagrams of the tube and base, and the arrangement of the electrode connections to the base terminals are shown in Figures 1 and 2.

Base—Medium, five-pin type with bayonet pin. Small, metal cap control-grid terminal at the top of the bulb.

Socket—Standard, five-contact type, such as the Western Electric 141A socket.

Mounting Positions—The 245A tube may be mounted in any position.

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Average Direct Intereiectrode Capacitances

	A	B
Control grid to plate	0.025	0.015 μμf
Control grid to heater, cathode and screen grid	4.5	5.5 μμf
Plate to heater, cathode and screen grid	8.0	8.5 μμf

Column A—Without shield.

Column B—With close-fitting metal shield connected to cathode.

Heater Rating

Heater voltage	2.0 volts, a.c. or d.c.
Nominal heater current	1.60 amperes

The heater element of this tube is designed to operate on a voltage basis and should be operated at as near the rated voltage as is practicable.

Cathode Connection—Preferably direct to the heater. If voltage is applied between the cathode and heater, it should be kept as low as possible and should never exceed 90 volts.

Characteristics—Plate current and screen-grid current characteristics for a typical 245A tube are shown as functions of plate voltage for several values of control-grid voltage in Figures 3 and 4 for screen-grid voltages of 45 and 67.5 volts, respectively. Plate current, screen-grid current, and transconductance characteristics are given in Figures 5, 6 and 7, respectively, as functions of control-grid voltage for the same two values of screen-grid voltage and three values of plate voltage. Corresponding amplification factor, and plate resistance characteristics are given in Figures 8, 9, 10 and 11.

Typical Operating Conditions

Plate Voltage	Screen-Grid Voltage	Control-Grid Bias	Plate Current	Screen-Grid Current	Amplification Factor	Plate Resistance	Transconductance
Volts	Volts	Volts	Milliamperes	Milliamperes		Ohms	Micromhos
135	45.0	−1.5	4.8	1.6	135	180,000	750
*135	67.5	−4.5	6.7	2.4	85	110,000	780
*180	45.0	−1.5	5.1	1.5	170	220,000	770

*Maximum operating conditions.

Microphonic Noise—With a plate voltage of 135 volts, a screen-grid voltage of 45 volts, a control-grid bias of −1.5 volts, and a load resistance of 100,000 ohms, the mean microphonic noise output level of the 245A tube measured in a laboratory reference test set is 29 decibels below 1 volt. The range of levels of individual tubes extends from 16 to 40 decibels. Since microphonic noise depends on the type and intensity of the mechanical disturbance which produces it, the values given here are useful chiefly for comparison with the levels of other tubes which have been tested in the same way.

Circuit Requirements—Screen-grid tubes are particularly well suited for use in high-frequency amplifiers and are capable of developing comparatively high gain per stage. In order to avoid undesired feed-back in the circuit, it is usually necessary to observe the following precautions: (1) use of a close-fitting shield around each tube, (2) shielding of each stage of the amplifier circuit, (3) use of a low-impedance condenser between the screen grid and cathode of each tube, (4) filtering of each battery lead to each tube, and (5) minimization of impedances common to the plate, screen-grid, control-grid, or cathode circuits of two or more tubes.

The screen-grid voltage should be obtained either directly from a low-resistance source or from a voltage divider. The use of a series resistance to reduce a high voltage supply to the desired value is not recommended because screen-grid currents differ widely in different tubes and vary during life in individual tubes.

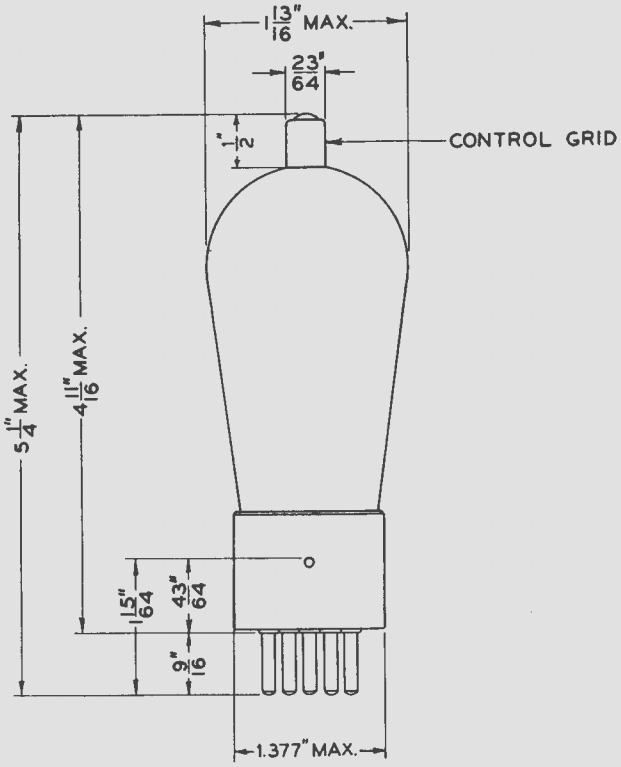

FIG. 1

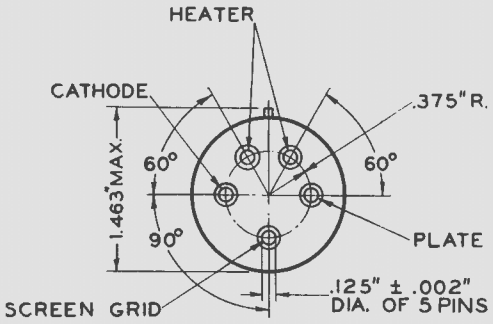

FIG. 2

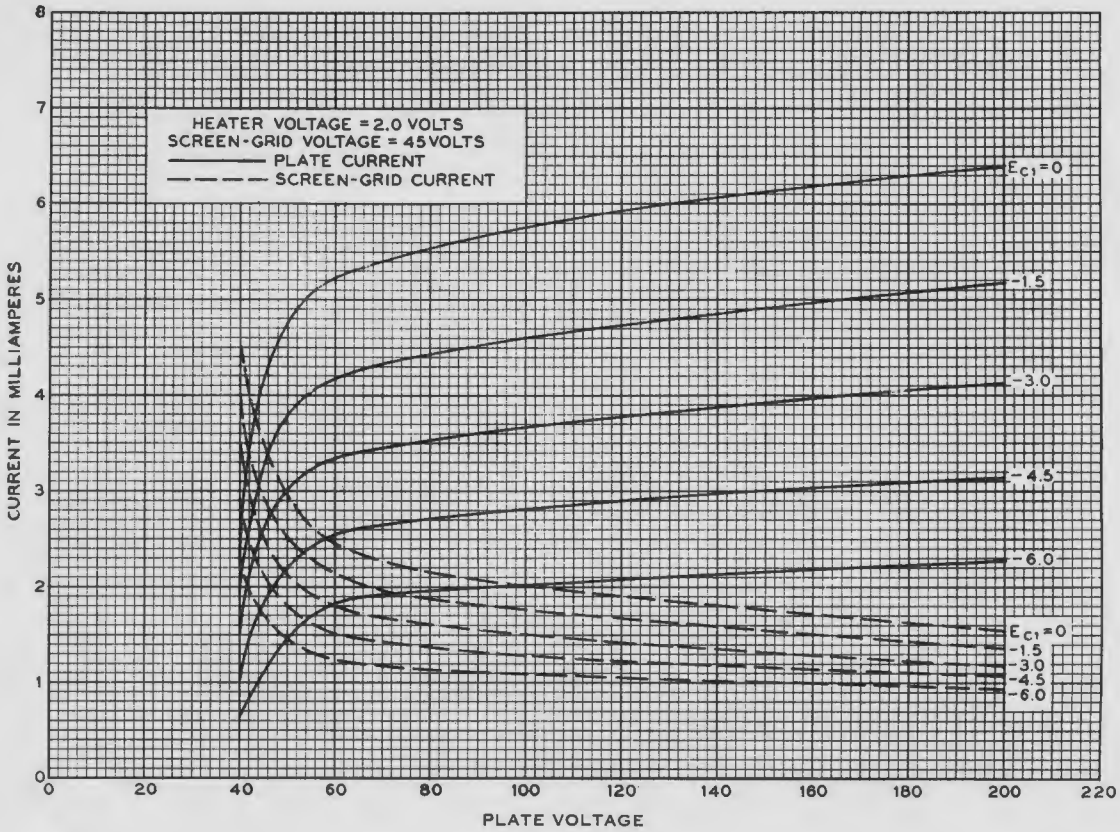
HEATER VOLTAGE = 2.0 VOLTS
SCREEN-GRID VOLTAGE = 45 VOLTS
PLATE CURRENT
SCREEN-GRID CURRENT
E_{C1}=0
-1.5
-3.0
-4.5
-6.0
E_{C1}=0
-1.5
-3.0
-4.5
-6.0
CURRENT IN MILLIAMPERES
PLATE VOLTAGE
0
1
2
3
4
5
6
7
8
0
20
40
60
80
100
120
140
160
180
200
220

FIG. 3

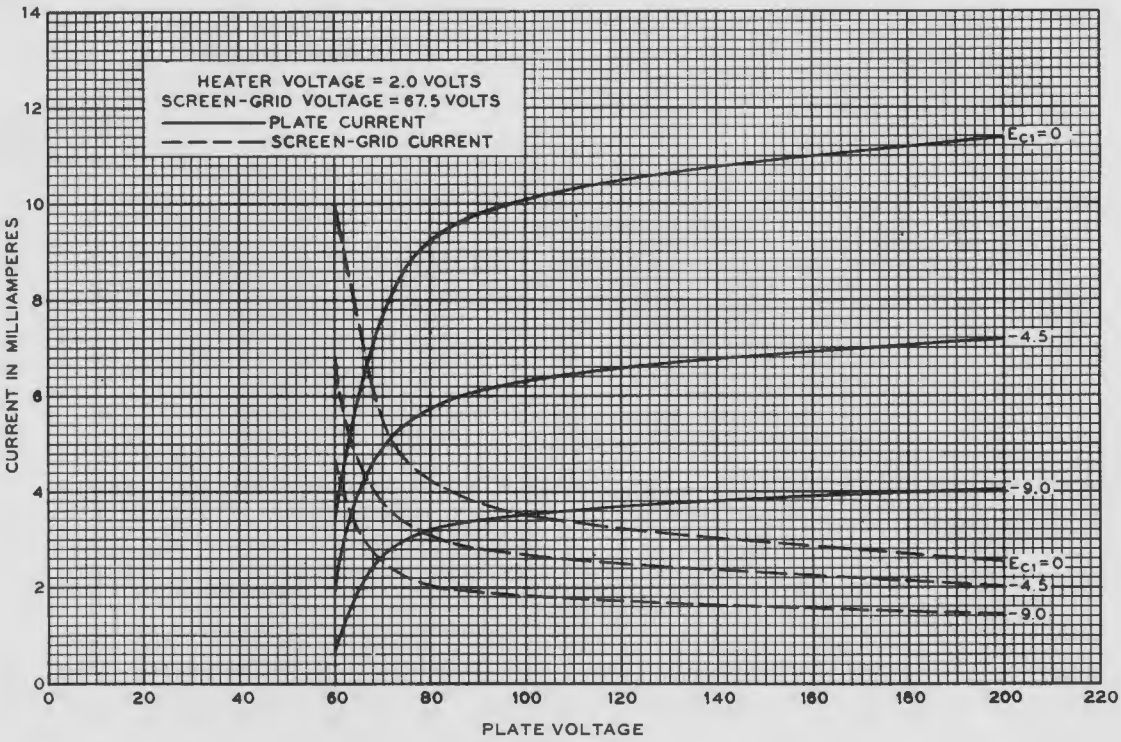
HEATER VOLTAGE = 2.0 VOLTS
SCREEN-GRID VOLTAGE = 67.5 VOLTS
PLATE CURRENT
SCREEN-GRID CURRENT
E_{C1}=0
-4.5
-9.0
E_{C1}=0
-4.5
-9.0
CURRENT IN MILLIAMPERES
PLATE VOLTAGE
0
2
4
6
8
10
12
14
0
20
40
60
80
100
120
140
160
180
200
220

FIG. 4

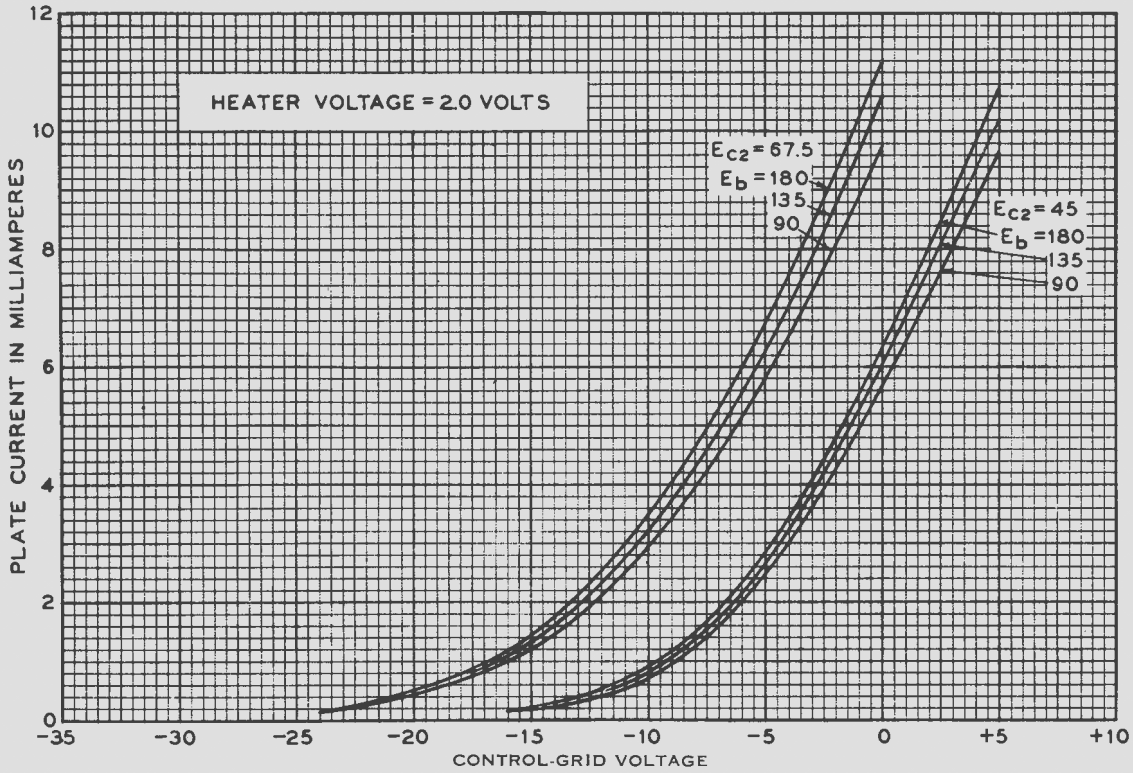

FIG. 5

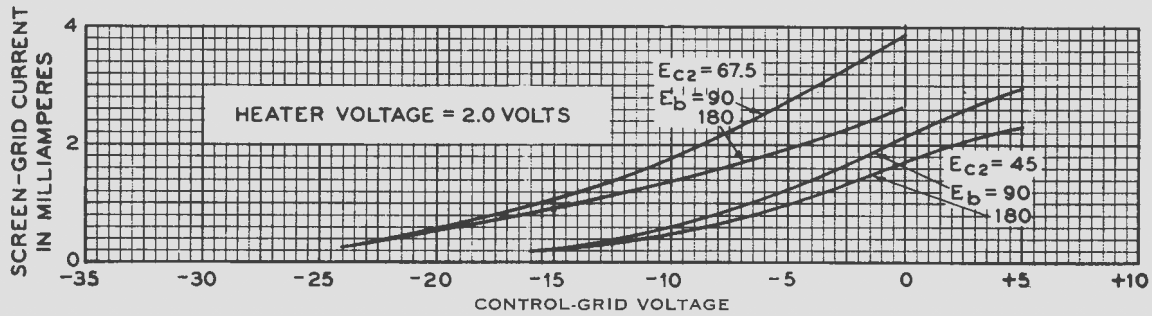

FIG. 6

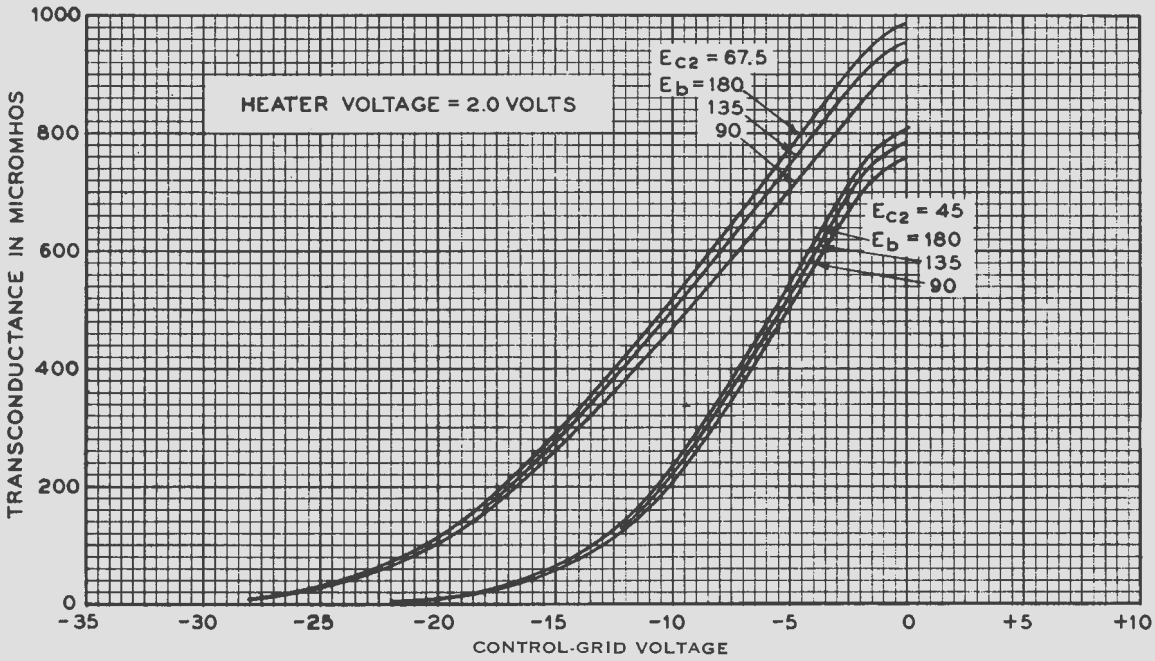

FIG. 7

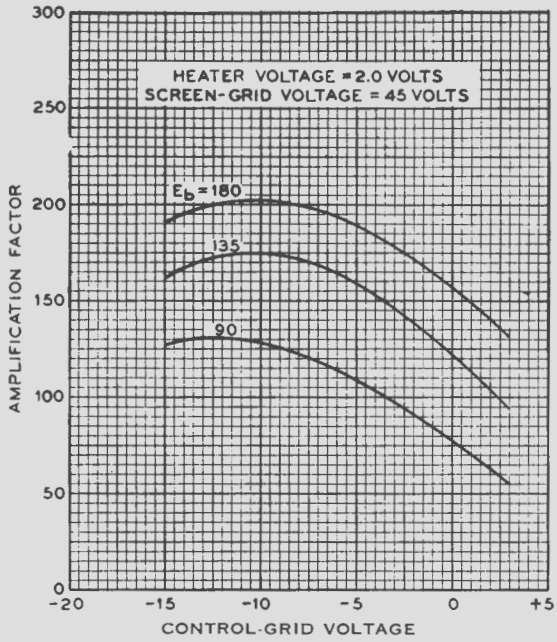

FIG. 8

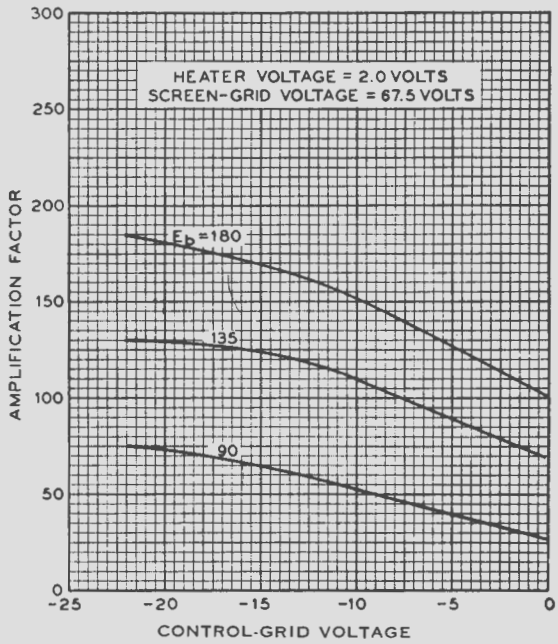

FIG. 9

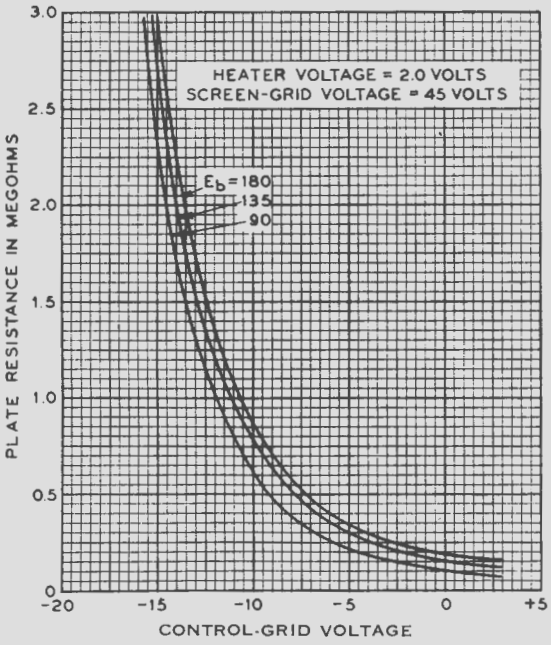

FIG. 10

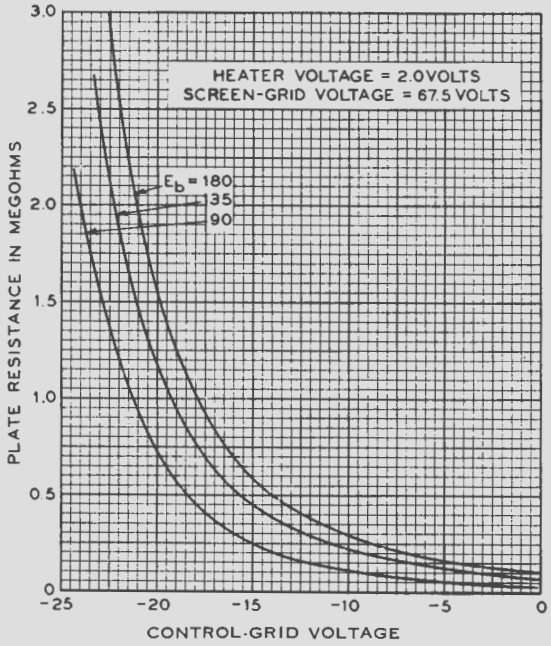

FIG. 11