BELL SYSTEM PRACTICES
Transmission Engineering and Data
Vacuum Tube Data

SECTION AB46.031
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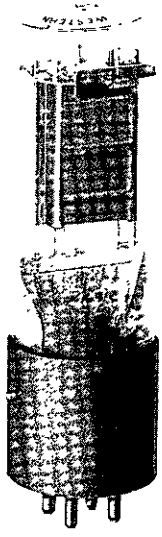
A T & T Co Standard

Western Electric

101D Vacuum Tube

(Dome)



Classification—Low-Power, Filamentary Triode

This tube replaces the D-86326 tube and has been assigned the old code number 101D. It includes an improved filament, a new mechanical design using transverse mica supports and is mounted in a dome type bulb. The electrical characteristics are essentially the same as for the D-86326 tube.

Applications—Voice frequency and carrier-frequency amplifier for telephone repeater equipment and other applications where small power outputs are required.

Modulator and demodulator in carrier-systems.

Oscillator in voice and carrier frequency applications.

Dimensions and Connections—Figures 1 and 2 show the outline diagrams of the tube and base, giving the dimensions and the arrangement of the electrode connections to the base terminals.

Base and Mounting—This vacuum tube employs a medium, four-pin bayonet type base having special contact metal at the ends of the pins. It is suitable for use in a Western Electric 100L, 100R, or similar type socket, preferably provided with contact-metal contacts.

The tube may be mounted in either a vertical or horizontal position. If mounted in a horizontal position the plane of the filament, which is indicated in Figure 2, should be vertical. To assure adequate ventilation the tubes should be mounted with not less than $2\frac{5}{8}$ inches between centers when two or more tubes are used.

Average Direct Interelectrode Capacitances

Grid to Plate	6.4 $\mu\mu$f
Grid to Filament	4.4 $\mu\mu$f
Plate to Filament	2.9 $\mu\mu$f

These values are for a based tube without socket.

Filament Rating

Filament Current	1.0 ampere, d.c.
Nominal filament voltage	4.5 volts

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

The filament resistance of this tube increases slightly during the first 2000 hours of operation. The voltage given above is the nominal value after this resistance change has stabilized.

Characteristics—Figure 3 shows typical curves of plate current as a function of grid voltage for several values of plate voltage. The grid and plate voltages are measured from the negative end of the filament. Figures 4, 5 and 6 show corresponding amplification factor, plate resistance and transconductance characteristics respectively. Figure 7 shows plate current as a function of plate voltage for several values of grid voltage.

Operating Conditions and Output—Figure 3 shows the range of permissible operating plate and grid voltages included within the area ABCD. A number of recommended and maximum operating conditions and the corresponding values of amplification factor, plate resistance, transconductance and performance data are given in the table.

Recommended conditions or others of no greater severity should be selected in preference to maximum conditions wherever possible. The life of the tube at maximum operating conditions will be shorter than at less severe conditions.

The performance data shown include the fundamental power output in milliwatts and the second and third harmonic levels in db below the fundamental for values of load resistance equal to the plate resistance and for a load resistance of 12000 ohms. The peak value of the sinusoidal input voltage E_{gm}, which gives the indicated output P_m, and harmonic levels F_{2m}, and F_{3m}, in each case is numerically equal to the grid bias. For a smaller input voltage E_g, the approximate levels may be computed from the following relations:

$$P = P_m\left(\frac{E_g}{E_{gm}}\right)^2$$

$$F_2 = F_{2m} + 20 \log_{10}\frac{E_{gm}}{E_g}$$

$$F_3 = F_{3m} + 40 \log_{10}\frac{E_{gm}}{E_g}$$

Microphonic Noise

For a plate voltage of 130 volts, a grid bias of -9 volts, and a load resistance of 100,000 ohms, the mean microphonic output level of this tube, measured in a laboratory reference test set is 32 db below 1 volt. The range of levels of individual tubes extends from 20 to 40 db below 1 volt. Since microphonic noise output 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 types of tubes which have been tested in the same way.

TABLE

	Plate Voltage Volts	Grid Bias Volts	Plate Current Milliamperes	Amplification Factor	Plate Resistance Ohms	Transconductance Micromhos	Load Resistance Ohms	Power Output Milliwatts	Second Harmonic db	Third Harmonic db
Recommended Operating Conditions	100	−4	8.1	6.2	5700	1090	5700	14	38	61
							12000	12	45	73
	130	−12	4.7	6.2	6800	900	6800	91	22	35
							12000	89	28	44
	130	−9	7.7	6.2	5800	1070	5800	65	31	48
							12000	58	37	57
	130	−6	11.2	6.2	5100	1220	5100	34	38	60
							12000	29	45	68
	160	−16	5.6	6.1	6500	940	6500	172	20	32
							12000	161	27	40
	160	−12	9.9	6.2	5300	1170	5300	121	29	46
							12000	108	37	56
Maximum Operating Conditions	160	−10	12.5	6.2	4900	1270	4900	93	33	53
							12000	79	41	64
	190	−20	6.4	6.1	6200	990	6200	263	19	30
							12000	250	26	37
	190	−18	8.7	6.2	5600	1100	5600	248	23	35
							12000	224	31	46
	190	−16	11.0	6.2	5100	1210	5100	223	26	42
							12000	187	35	54

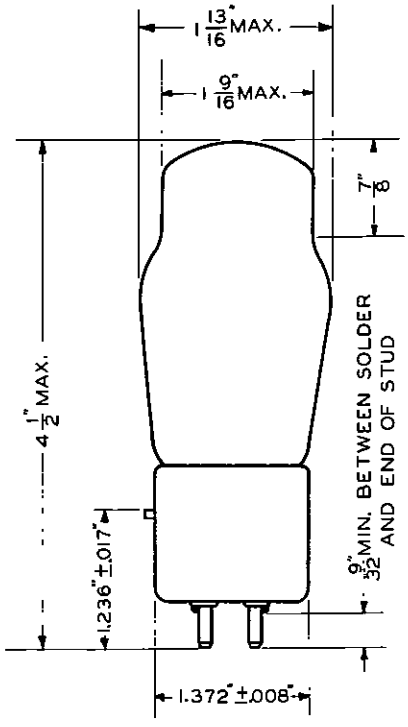


FIG. 1

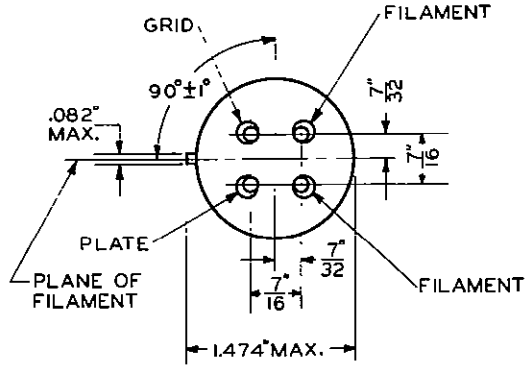


FIG. 2

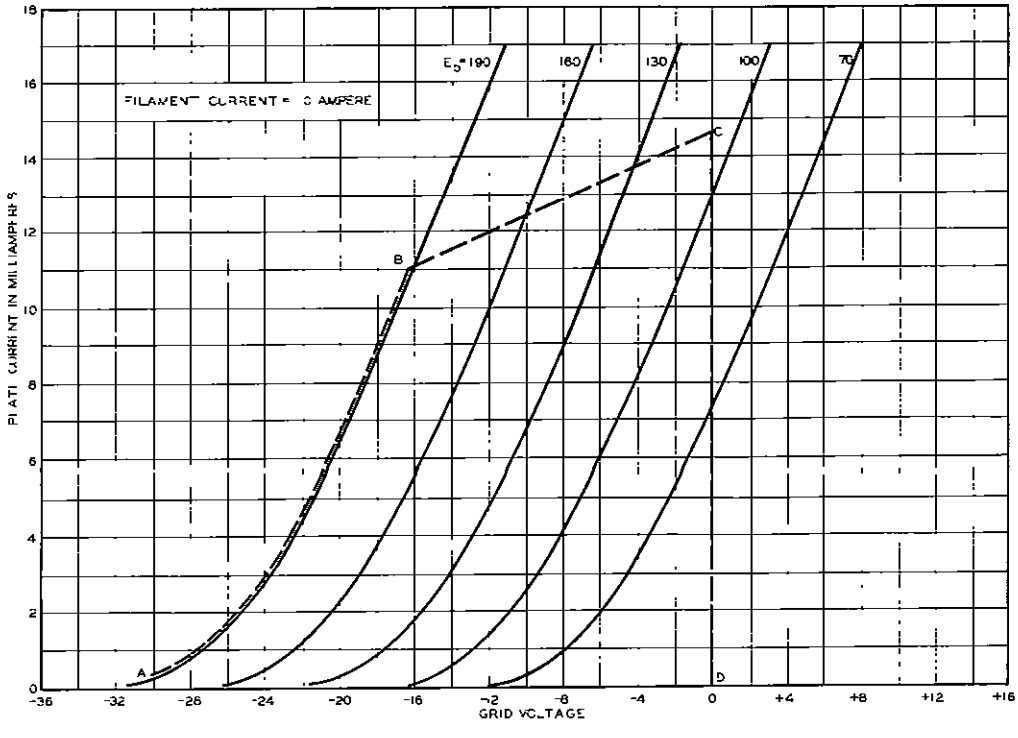


FIG. 3

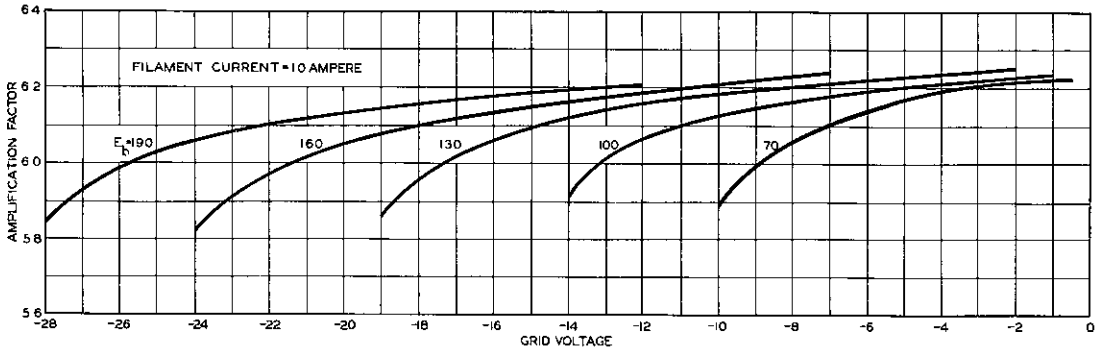


FIG. 4

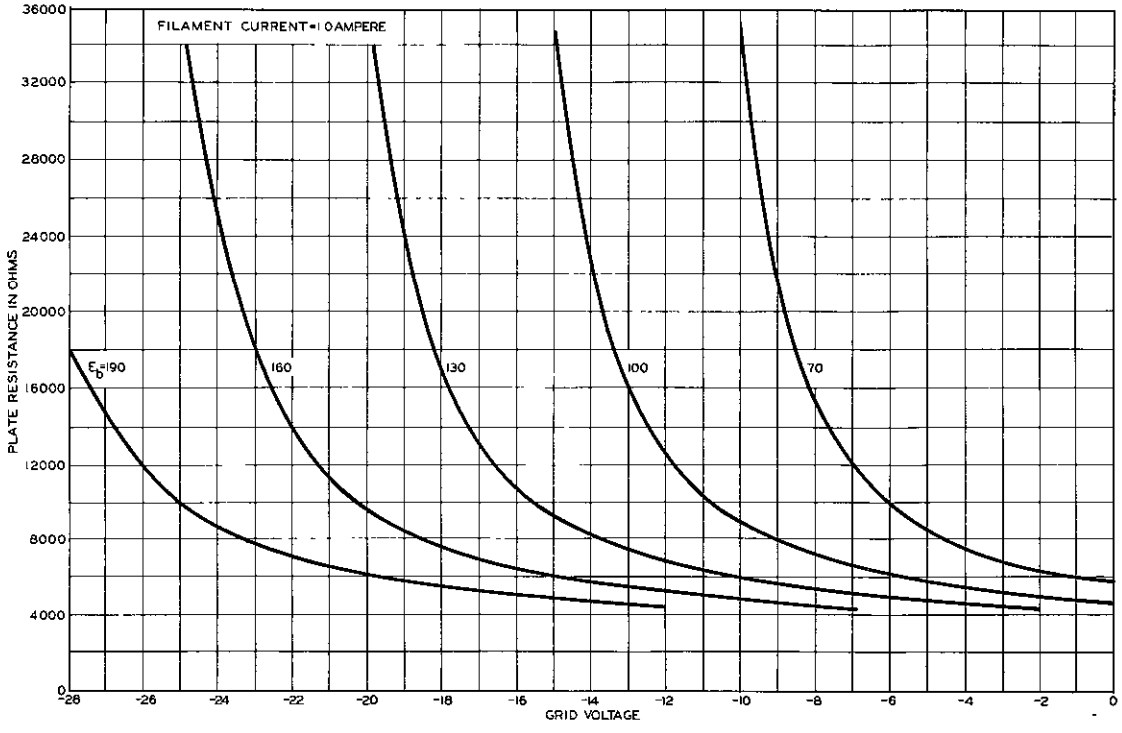


FIG. 5

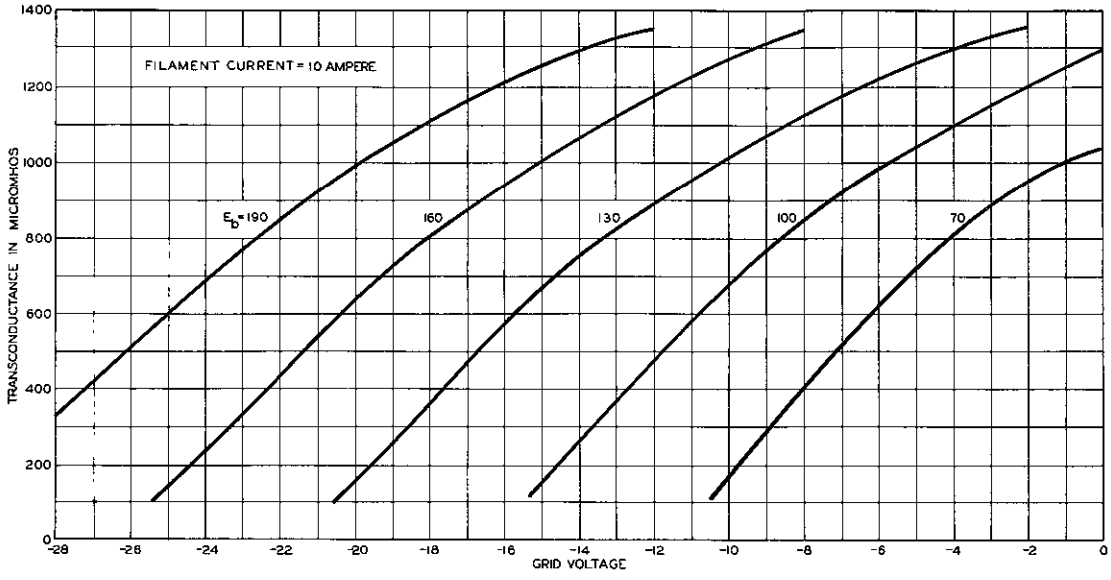


FIG. 6

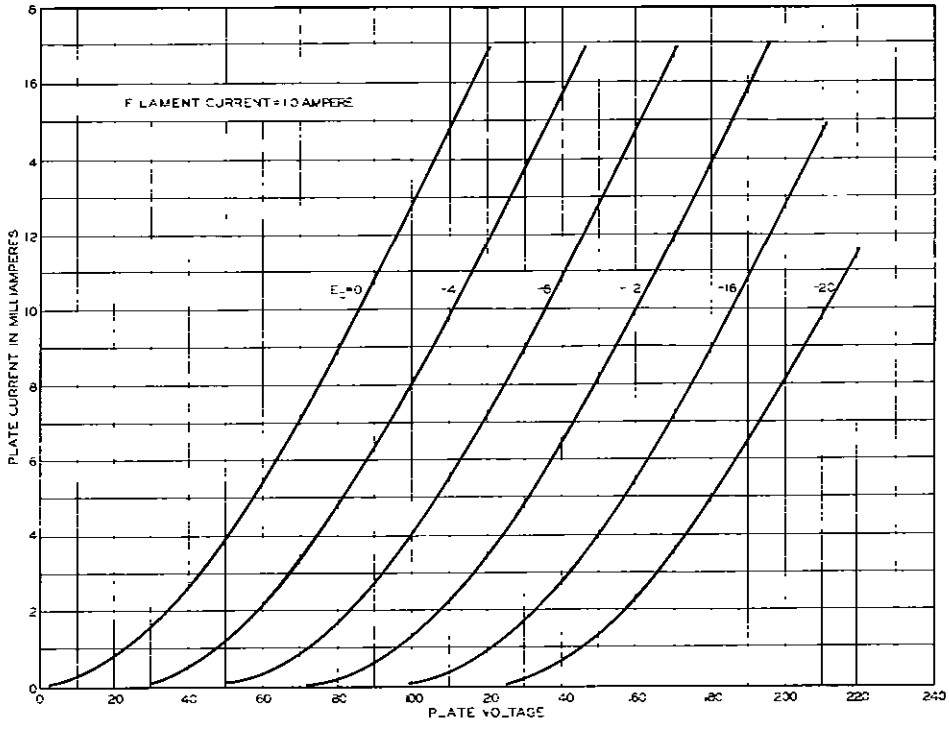


FIG. 7

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