4694 Pentode

The 4694 is an indirectly-heated steep-slope 9 W pentode. In balanced stages the available output is 12 to 13 W, which makes the valve very attractive for use in 10 W amplifiers. The maximum anode voltage is 400 V, that is to say 400 V on the anode and 425 V on the screen; the latter potential is thus slightly higher than that of the anode, so that allowance may be made for the voltage drop occurring across the output transformer. It is not necessary to feed the screen from a potential divider and the losses inherent in this type of feed are thus avoided, whilst the output is not reduced by decreases in the screen voltage at max. modulation. The relatively high working voltages of this valve make it possible to employ pre-amplification stages of very high sensitivity. Moreover, due to the high mutual conductance the alternating grid voltage is extremely low; grid bias, therefore, must be of the automatic type.

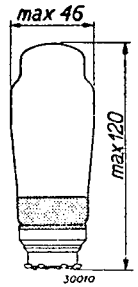
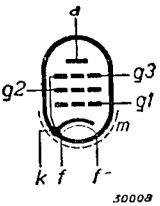


Fig. 1
Dimensions in mm.

HEATER RATINGS

Heating: indirect, A.C.; parallel supply.

Heater voltage	V_f	= 6.3 V
Heater current	I_f	= 0.9 A



CAPACITANCES

Anode-grid	C_{ag1}	< 0.8 $\mu\mu$F

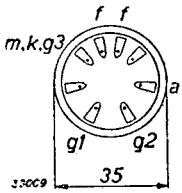
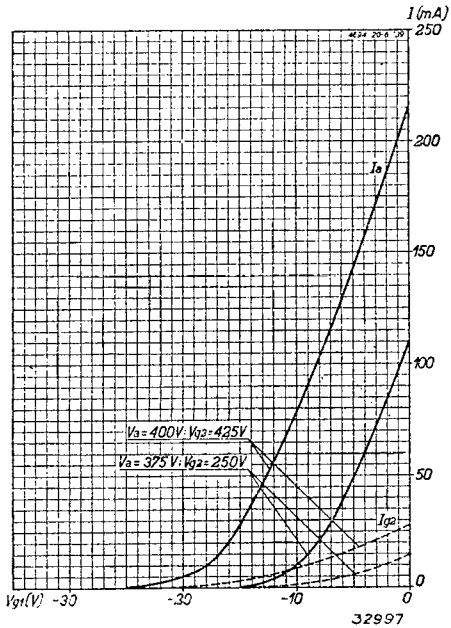


Fig. 2
Arrangement of electrodes and base connections.



STATIC DATA

Anode voltage	V_a	= 400 V
Screen-grid voltage	V_{g2}	= 425 V
Grid bias	V_{g1}	= —15.6 V
Anode current	I_a	= 22 mA
Screen-grid current	I_{g2}	= 2.8 mA
Mutual conductance	S	= 7 mA/V
Internal resistance	R_i	= 75,000 ohms

Fig. 3
Anode and screen-grid current of the 4694 as functions of the grid bias, with respect to different anode and screen voltages.

OPERATING DATA

		Class AB output with auto. bias (2 valves)
Anode voltage	V_a =	400 V
Screen-grid voltage	V_{g2} =	425 V
Common cathode resistor	R_k =	315 ohms
Anode current (without signal)	I_{ao} =	2 × 22 mA
Anode current at max. modulation	$I_{a\,max}$ =	2 × 25 mA
Screen current (without signal)	I_{g2o} =	2 × 2.8 mA
Screen current at max. modulation	$I_{g2\,max}$ =	2 × 6.2 mA
Load resistor (between anodes)	R_{aa} =	20,000 ohms
Power output	W_o =	13 W
Alternating grid voltage	V_i =	9 V_{eff}
Distortion at maximum modulation	d_{tot} =	5 %

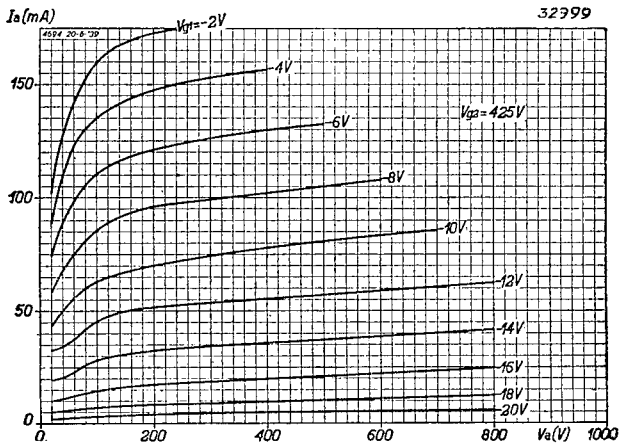


Fig. 4
Anode current as a function of the anode voltage for various values of grid bias. Vg_2 = 425 V.

MAXIMUM RATINGS per valve

V_{ao}	=	max. 650 V
V_a	=	max. 400 V
W_a	=	max. 9 W
V_{g2o}	=	max. 650 V
V_{g2}	=	max. 425 V
W_{g2} (V_i	=	0)
	=	max. 1.3 W
W_{g2} (W_o	=	max.)
	=	max. 2.7 W
I_k	=	max. 55 mA
V_{g1} (I_{g1}	=	+ 0.3 μA)
	=	max. —1.3 V
R_{g1k}	=	max. 1 M ohm
R_{fk}	=	max. 5,000 ohms
V_{fk}	=	max. 50 V

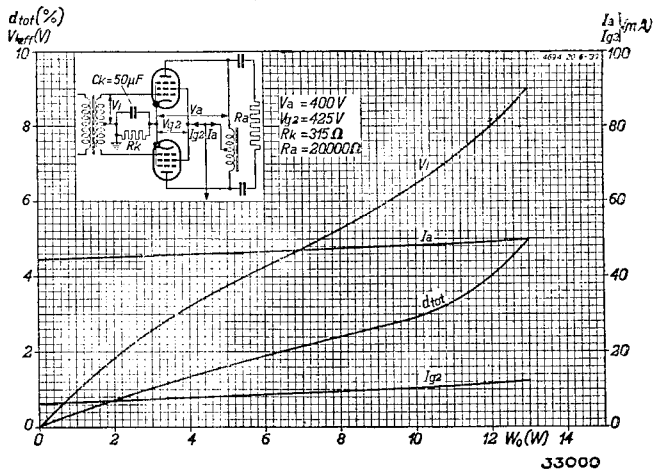


Fig. 5
Total distortion, total anode and screen-grid current and alternating grid voltage, per grid, as functions of the output power. 2 valves 4694 in a Class AB output stage with auto. bias.