

EL 51 Pentode

The EL 51 is a 45 W pentode for use in large amplifier equipment. Two of these valves in a balanced circuit with an anode and screen potential of 750 V will deliver an output of 140 W. A 68 W electric lamp must be connected in series with the screen grids to prevent the screen-grid being overloaded. The fact that the screen carries the same potential as the anode affords many possibilities in connection with the application of this valve, since the screen can be fed directly from the high-tension line, without necessitating the use of a potential divider carrying a high current.

The grid input for maximum modulation is quite small on account of the high mutual conductance; the heater consumption is, nevertheless, relatively low, being 12 W.

HEATER RATINGS

Heating: indirect by A.C. or D.C.; parallel supply.

Heater voltage $V_f = 6.3$ V

Heater current $I_f = 1.9$ A

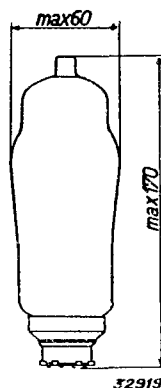


Fig. 1
Dimensions in mm.

CAPACITANCES

Anode-grid $C_{ag1} < 1.5 \mu\text{F}$

STATIC RATINGS

Anode voltage $V_a = 500 \quad 750$ V

Screen-grid voltage $V_{g2} = 500 \quad 750$ V

Grid bias $V_{g1} = -20 \quad -37.5$ V

Anode current $I_a = 87 \quad 60$ mA

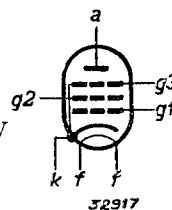
Screen-grid current $I_{g2} = 13 \quad 10$ mA

Mutual conductance $S = 11 \quad 8$ mA/V

Amplification factor; screen with

respect to control grid. $\mu_{g2g1} = 16,500 \quad 16,500 \quad -$

Internal resistance $R_i = 33,000 \quad 50,000$ ohms



OPERATING DATA

The EL 51 used in class B output stage with fixed grid bias (two valves)

Anode voltage $V_a = 750$ V

Screen-grid voltage $V_{g2} = 750$ V¹⁾

Grid bias $V_{g1} = -40$ V

Load resistor between anodes $R_{aa} = 6,000$ ohms

Alternating input voltage $V_i = 0 \quad 28.5$ V_{eff}

Anode current $I_a = 2 \times 40 \quad 2 \times 145$ mA

Screen-grid current $I_{g2} = 2 \times 7.5 \quad 2 \times 30$ mA

Power output $W_o = 0 \quad 140$ W

Total distortion $d_{tot} = - \quad 5$ %

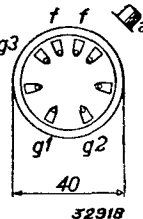


Fig. 2
Arrangement of
electrodes and
base connections.

¹⁾ A resistor of 1,000 ohms should be included in series with the common screen-grid lead, or, better still, a special electric lamp (550 V, 68 W).

The EL 51 used in class AB output stage with auto. grid bias (two valves)

Anode voltage	$V_a =$	500	V
Screen-grid voltage	$V_{g2} =$	500	V
Common cathode resistor	$R_k =$	100	ohms
Load resistor between anodes	$R_{aa} =$	4,800	ohms
Alternating input voltage	$V_i =$	0	19 V_{eff}
Anode current	$I_a =$	2×87	2×110 mA
Screen-grid current	$I_{g2} =$	2×13	2×23 mA
Power output	$W_o =$	0	67.5 W
Total distortion	$d_{tot} =$	—	5 %

MAXIMUM RATINGS

V_{ao}	$=$ max.	1,500 V	I_k	$=$ max.	200 mA
V_a	$=$ max.	750 V	V_{g1} ($I_{g1} = +0.3 \mu A$)	$=$ max.	—1.3 V
W_a	$=$ max.	45 W	R_{g1} (fixed bias)	$=$ max.	0.35 M ohm
V_{g2o}	$=$ max.	1,500 V	R_{g1} (auto. bias)	$=$ max.	0.7 M ohm
V_{g2}	$=$ max.	750 V	V_{fk}	$=$ max.	50 V
W_{g2} ($V_i = 0$)	$=$ max.	7 W	R_{fk}	$=$ max.	20,000 ohms
W_{g2} ($W_o = \text{max.}$)	$=$ max.	25 W			

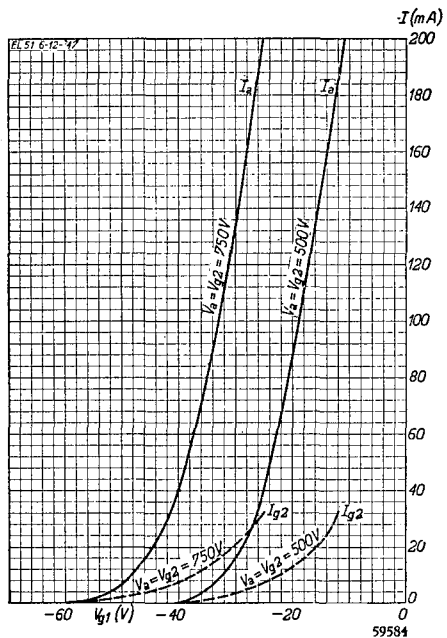


Fig. 3
Anode and screen current of the EL 51 as functions of the grid bias, for various values of anode and screen potential.

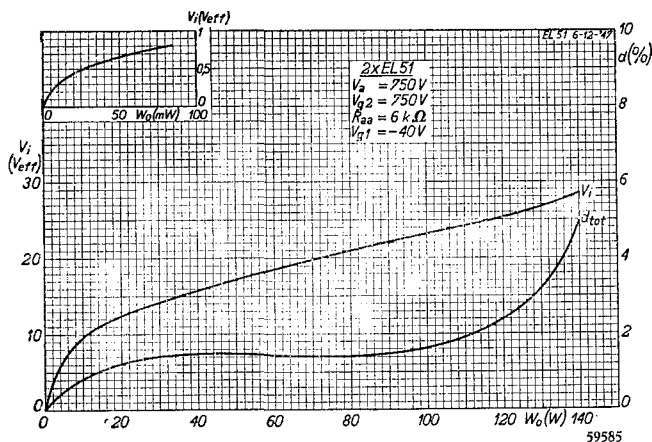


Fig. 4

Total distortion and alternating input voltage as functions of the output power; 2 valves EL 51 used in class B output stage with fixed grid bias, $V_a = V_{g2} = 750 V$.

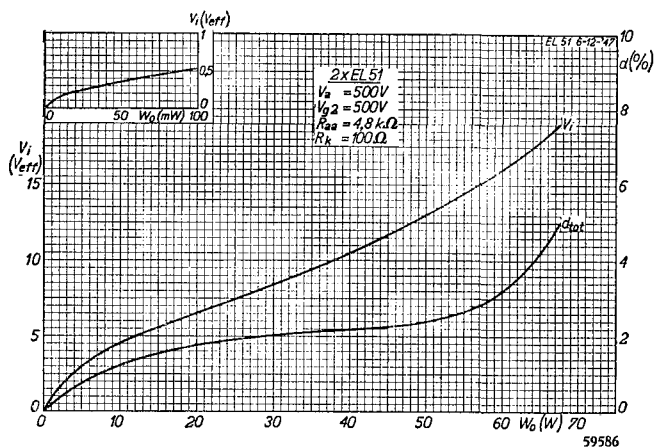


Fig. 5

Total distortion and alternating input voltage as functions of the output power; 2 valves EL 51 used in class AB output stage with auto. grid bias, $V_a = V_{g2} = 500 V$.