

## S.Q. TUBE

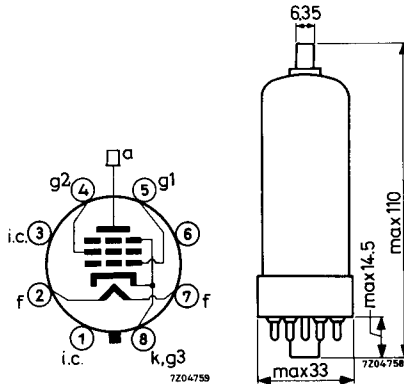
Special quality output pentode designed for use as line output tube, power output tube, wide band amplifier and series regulator tube.

QUICK REFERENCE DATA		
Life test	10 000 hours	
Low interface resistance		
Mechanical quality	Shock and vibration resistant	
Base	Octal	
Heating	Indirect A.C. or D.C.; parallel supply	
Heater voltage	$V_f$	6.3 V
Heater current	$I_f$	1.2 A
Anode current	$I_a$	100 mA
Mutual conductance	S	14 mA/V
Output power. Class B (2 tubes)	$W_o$	30 W

### DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: Octal



## CHARACTERISTICS

Column I Nominal value or setting of the tube

II Range values for equipment design: Initial spread

III Range values for equipment design: End of life

		I	II	III	
Heater voltage	$V_f$	6.3			V
Heater current	$I_f$	1.2	1.12 - 1.28		A
Anode voltage	$V_a$	100			V
Grid No. 2 voltage	$V_{g_2}$	100			V
Cathode resistor	$R_k$	75			$\Omega$
Anode current	$I_a$	100	85 - 118	min. 65	mA
Grid No. 2 current	$I_{g_2}$	5.2	4.0 - 6.5		mA
Mutual conductance	S	14	11.5 - 16.5	min. 9.5	mA/V
Amplification factor	$\mu_{g_2g_1}$	5.6			
Internal resistance	$R_i$	5.0			k $\Omega$
<u>Cut-off voltage</u>	$-V_{g_1}$	35			V
Anode current	$I_a$	0.1			mA
<u>Negative grid No. 1 current</u>	$-I_{g_1}$		max. 1	max. 2	$\mu$ A
<u>Cut-off voltage</u>	$-V_{g_1}$		max. 120		V
Anode voltage	$V_a$	7			kV <sub>p</sub>
Grid No. 2 voltage	$V_{g_2}$	190			V
Cathode current	$I_k$	60			$\mu$ A
<u>As triode (grid No. 2 connected to anode)</u>					
Anode voltage	$V_a$	100			V
Cathode resistor	$R_k$	85			$\Omega$
Anode current	$I_a$	100			mA
Mutual conductance	S	14			mA/V
Amplification factor	$\mu$	5.2			
Internal resistance	$R_i$	350			$\Omega$

**CHARACTERISTICS** (continued)Insulation resistance between:

Anode and other electrodes

 $R_{ins}$ min. 100 M $\Omega$ 

Grid No. 1 and other electrodes

 $R_{ins}$ min. 100 M $\Omega$ Leakage current between  
cathode and heater $I_{kf}$ max. 20  $\mu$ A**CAPACITANCES**Anode to grid No. 2, grid No. 3,  
cathode and heater $C_{a/g_2g_3kf}$ 

10

9 - 11 pF

Grid No. 1 to grid No. 2, grid No. 3,  
cathode and heater $C_{g_1/g_2g_3kf}$ 

19

17.5 - 20.5 pF

Anode to grid No. 1

 $C_{ag_1}$ 

max. 1.1 pF

**SHOCK AND VIBRATION RESISTANCE**

The following test conditions are applied to assess the mechanical quality of the tube. These conditions are not intended to be used as normal operating conditions.

Shock

The tube is subjected 5 times in each 4 positions to an acceleration of 500 g supplied by an NRL shock machine with the hammer lifted over an angle of 30 $^{\circ}$ .

Vibration

The tube is subjected during 32 hours in each of 3 positions to a vibration frequency of 50 Hz with an acceleration of 2.5 g.

**LIFE**

Production samples are tested to be within the end of life values (column III) during 10 000 hours.

**LIMITING VALUES** (Absolute max. rating system)

Anode voltage	$V_{a_0}$	max.	650 V
	$V_a$	max.	400 V
Anode peak voltage	$+V_{a_p}$	max.	7 kV
	$-V_{a_p}$	max.	1.5 kV
Pulse duration = max. 18 $\mu$ sec			
Duty factor = max. 0.22			
Anode dissipation	$W_a$	max.	15 W
Anode + grid No. 2 dissipation	$W_{a+g_2}$	max.	16 W
Grid No. 2 voltage	$V_{g_{2_0}}$	max.	650 V
	$V_{g_2}$	max.	300 V
Grid No. 2 dissipation	$W_{g_2}$	max.	5.5 W
Grid No. 2 dissipation during heating up of EHT diode	$W_{g_2}$	max.	7.0 W
Grid No. 1 peak voltage	$-V_{g_{1_p}}$	max.	1 kV
Pulse duration = max. 18 $\mu$ sec			
Duty factor = max. 0.22			
Grid No. 1 resistor	$R_{g_1}$	max.	0.5 M $\Omega$
Grid No. 1 resistor in line output circuits	$R_{g_1}$	max.	2.2 M $\Omega$
Cathode current	$I_k$	max.	220 mA
Cathode peak current	$I_{k_p}$	max.	1.2 A
Averaging time = max. 10 msec			
Voltage between cathode and heater			
Cathode positive	$V_{kf}$ (k pos)	max.	250 V
Cathode negative	$V_{kf}$ (k neg)	max.	200 V
Bulb temperature	$t_{bulb}$	max.	220 $^{\circ}$ C

Heater voltage: The average heater value should be 6.3 V.

Variation of the heater voltage exceeding the range of 6.0 V to 6.6 V will shorten the tube life.

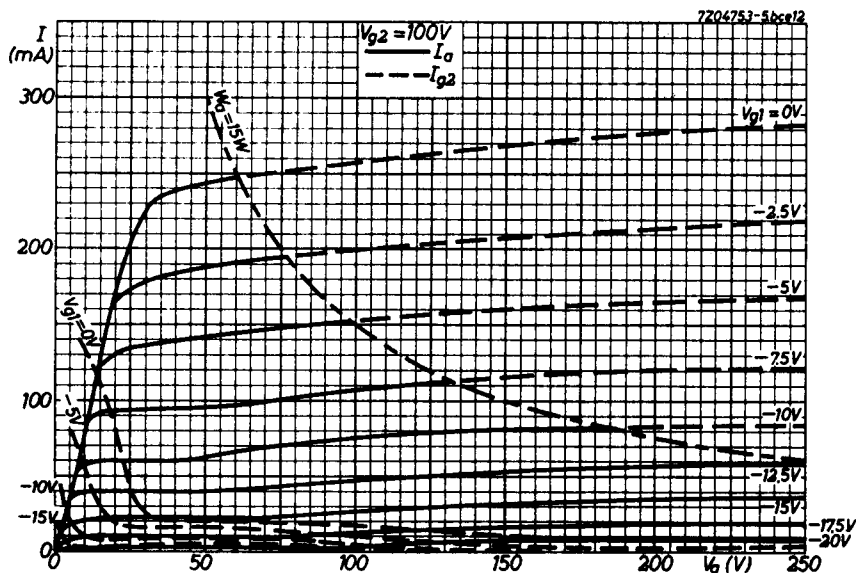
The tolerance of heater current should be taken into account.

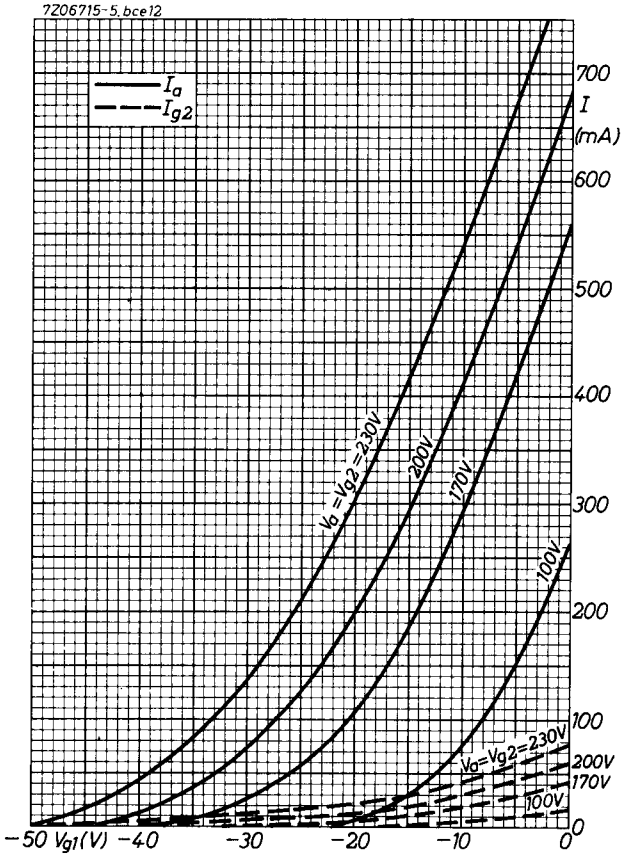
## OPERATING CHARACTERISTICS

Output tube class B (2 tubes) Excitation to maximum output is continuously permitted.

Anode voltage	$V_a$	250	V
Grid No. 2 voltage	$V_{g2}$	170	V
Grid No. 1 voltage	$-V_{g1}$	34	V
Load resistance	$R_{aa} \sim$	3	$k\Omega$
Grid No. 2 resistor	$R_{g2}$	2x0.5	$k\Omega$ <sup>1)</sup>
Input voltage	$V_i$	0	22 $V_{RMS}$
Anode current	$I_a$	2x12	2x94 mA
Grid No. 2 current	$I_{g2}$	2x1	2x28 mA
Output power	$W_o$	0	30 W
Total distortion	$d_{tot}$		6 %

<sup>1)</sup> To avoid overloading of grid No. 2 this resistor should not be by-passed.





# PHILIPS

Data handbook



Electronic  
components  
and materials

## E236L

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