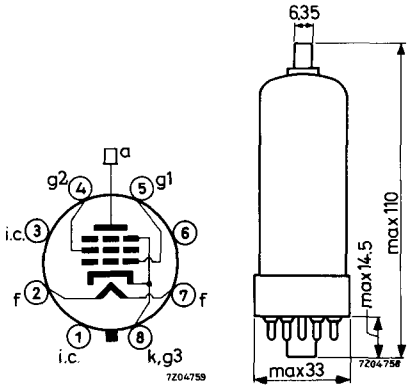
S.Q. TUBE

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			Ω
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			kΩ
Cut-off voltage	$-V_{g_1}$	35			V
Anode current	I_a	0.1			mA
Negative grid No.1 current	$-I_{g_1}$		max. 1	max. 2	μA
Cut-off voltage	$-V_{g_1}$		max. 120		V
Anode voltage	V_a	7			kV_p
Grid No.2 voltage	V_{g_2}	190			V
Cathode current	I_k	60			μA
As triode (grid No.2 connected to anode)					
Anode voltage	V_a	100			V
Cathode resistor	R_k	85			Ω
Anode current	I_a	100			mA
Mutual conductance	S	14			mA/V
Amplification factor	μ	5.2			
Internal resistance	R_i	350			Ω

CHARACTERISTICS (continued)

		II	
Insulation resistance between:			
Anode and other electrodes	R_{ins}	min. 100	MΩ
Grid No. 1 and other electrodes	R_{ins}	min. 100	MΩ
Leakage current between cathode and heater	I_{kf}	max. 20	μA

CAPACITANCES

		I	II	
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°.

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_o}	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 μsec				
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	$V_{g_{2o}}$	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	$-V_{g_{1p}}$	max.	1	kV
Pulse duration = max. 18 μsec				
Duty factor = max. 0.22				
Grid No.1 resistor	R_{g_1}	max.	0.5	MΩ
Grid No.1 resistor in line output circuits	R_{g_1}	max.	2.2	MΩ
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	°C

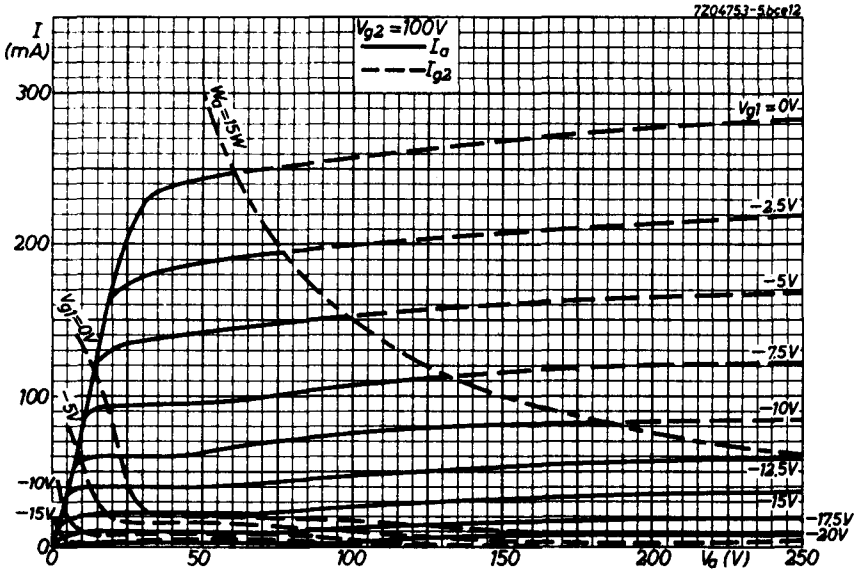
Heater voltage: The average heater value should be 6.3 V.
Variation of the heater voltage exceeding the range of 6.0 V to 6.6 V will shorten the tube life.
The tolerance of heater current should be taken into account.

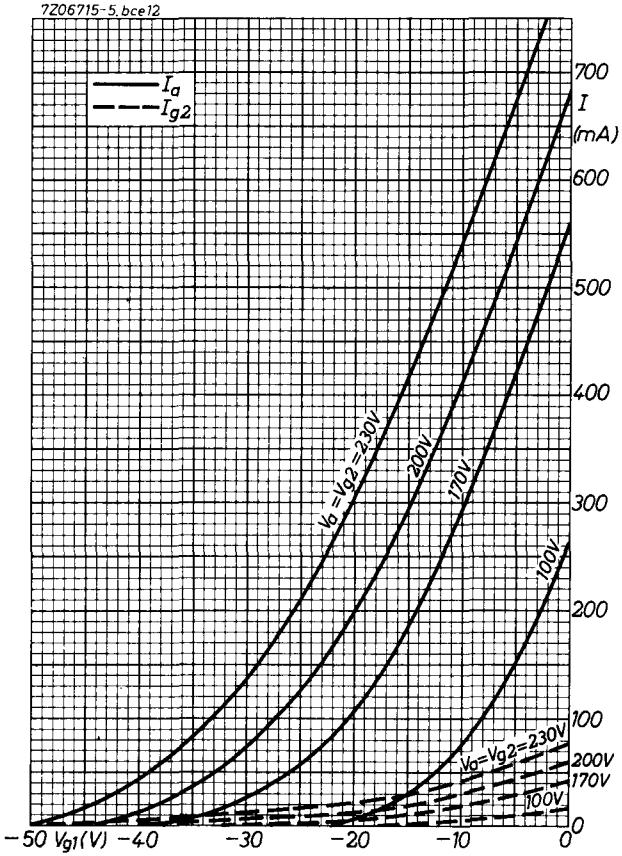
OPERATING CHARACTERISTICS

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	kΩ
Grid No.2 resistor	R_{g2}		2x0.5	kΩ [1]
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	%

[1]) To avoid overloading of grid No.2 this resistor should not be by-passed.

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I_a
I_{g2}
700
I
(mA)
600
500
400
300
200
100
0
$V_a = V_{g2} = 230V$
200V
170V
100V
$V_a = V_{g2} = 230V$
200V
170V
100V
−50 V_{g1}(V) −40
−30
−20
−10
0

PHILIPS

Data handbook

Electronic components and materials

E236L

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