

S.Q. TUBE

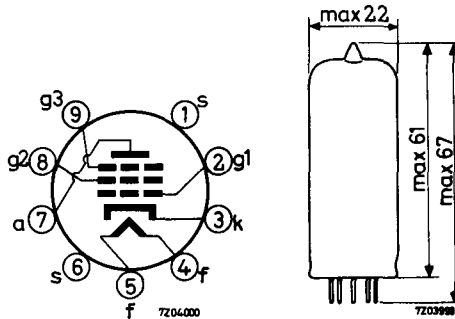
Output pentode designed for use in telephone equipment.

QUICK REFERENCE DATA		
Life test	10 000 hours	
Base	Noval	
Heating	Indirect A.C. or D.C. Series or parallel supply	
Heater voltage	V_f	18 V
Heater current	I_f	130 mA
Anode current	I_a	20 mA
Output power, Class A	W_o	1 W

DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: Noval



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	18			V
Heater current	I_f	130	123 - 137		mA
Anode voltage	V_a	210			V
Grid No.3 voltage	V_{g3}	0			V
Grid No.2 voltage	V_{g2}	210			V
Cathode resistor	R_k	120			Ω
Anode current	I_a	20	17 - 23	min. 13.5	mA
Grid No.2 current	I_{g2}	5.3	4.1 - 6.5	min. 3.1	mA
Mutual conductance	S	11	9.5 - 12.5	min. 7.8	mA/V
Internal resistance	R_i	0.3	min. 0.2		$M\Omega$
Output power	W_o	1.0	min. 0.7		W
Load resistance $R_{a\sim} = 15\text{ k}\Omega$					
Total distortion $d_{tot} = 5\%$					
Total distortion at $W_o = 0.1\text{ W}$	d_{tot}	1.2	max. 2		%
Amplification factor	μ_{g2g1}	36			
Equivalent noise resistance (R.F.)	R_{eq}	1.2			$k\Omega$
<u>Negative grid current</u>	$-I_{g1}$		max. 0.5	max. 1.0	μA
<u>Cut-off voltage</u>	$-V_{g1}$		max. 8.5		V
Anode current	I_a	0.5			mA
<u>Hum voltage</u>	V_{g1}		max. 0.2		mV _{RMS}
$R_{g1} = 0.5\text{ M}\Omega$					
Heater centre earthed					
<u>Insulation resistance between two electrodes</u>	R_{ins}		min. 100		$M\Omega$

CHARACTERISTICS (continued)

Leakage current between
cathode and heater

 I_{kf}

Voltage between cathode and
heater $V_{kf} = 120$ V

Cathode heating time

Cathode cooling time

	I	II		
		max.	24	
				μA
	16	max.	22	sec
	15	min.	7	sec

CAPACITANCES

Anode to grid No.2, grid No.3,
cathode, heater and screen

 C_{a/g_2g_3kfs}

6.5

5.8 - 7.2

pF

Grid No.1 to grid No.2, grid No.3,
cathode, heater and screen

 C_{g_1/g_2g_3kfs}

11.2

10 - 12.4

pF

Grid No.1 to grid No.2, grid No.3,
cathode, heater and screen

 C_{g_1/g_2g_3kfs}

14.3

pF

Cathode current $I_k = 25$ mA

Anode to grid No.1

 C_{ag_1}

max.0.02

pF

Grid No.1 to heater

 C_{g_1f}

max. 0.2

pF

Cathode to heater

 C_{kf}

4.2

pF

Radiation capacitance: Anode to
surrounding box, inner dia. 52 mm,
height 98 mm

 C_{ra}

max.0.06

pF

Radiation capacitance: Grid No.1 to
surrounding box, inner dia. 52 mm,
height 98 mm

 C_{rg_1}

max.0.12

pF

LIFE

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

LIMITING VALUES (Design centre rating system)

Anode voltage	V_{a0}	max. 550 V
	V_a	max. 210 V
Anode dissipation	W_a	max. 4.5 W
Grid No.2 voltage	V_{g20}	max. 550 V
	V_{g2}	max. 210 V
Grid No.2 dissipation	W_{g2}	max. 1.2 W
Cathode current	I_k	max. 30 mA
Voltage between cathode and heater	V_{kf}	max. 120 V
Bulb temperature	t_{bulb}	max. 170 °C
Grid resistor, automatic bias	R_{g1}	max. 0.5 MΩ
fixed bias	R_{g1}	max. 0.25 MΩ

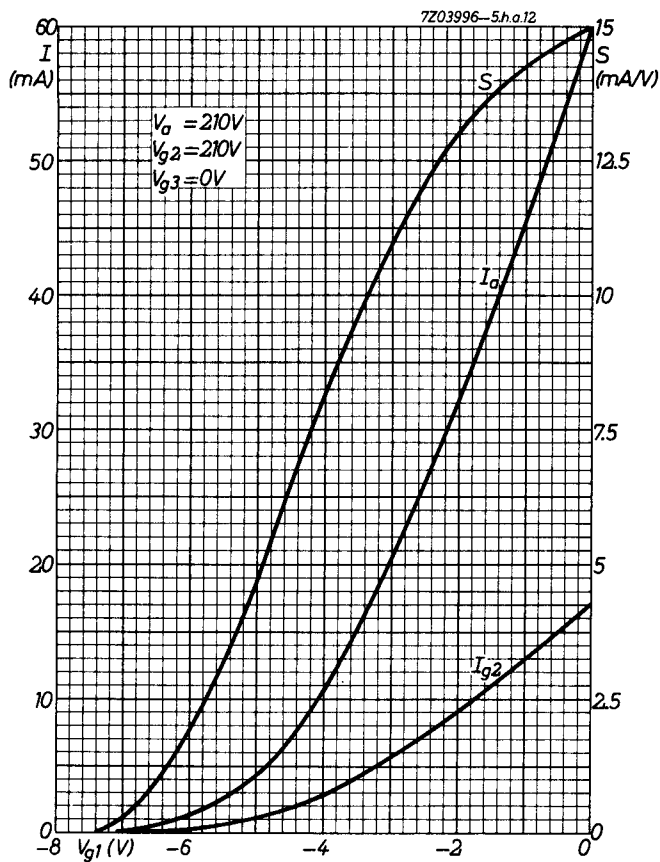
OPERATING CHARACTERISTICSAs pre-amplifier

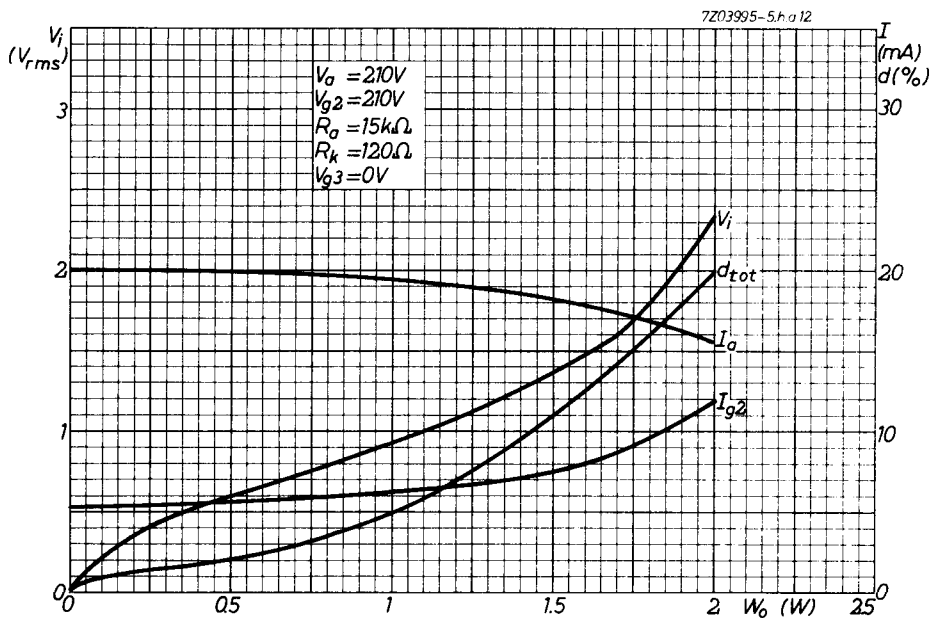
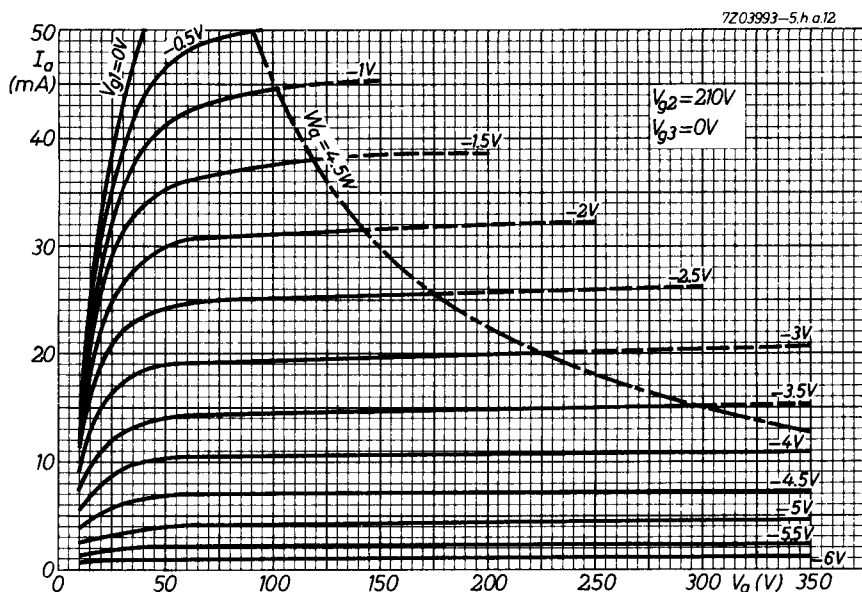
Anode voltage	V_a	210 V
Grid No.3 voltage	V_{g3}	0 V
Grid No.2 voltage	V_{g2}	210 V
Cathode resistor	R_k	180 Ω
Anode resistance	$R_{a\sim}$	20 kΩ
Anode current	I_a	15 mA
Grid No.2 current	I_{g2}	4 mA
Mutual conductance	S	10 mA/V
Internal resistance	R_i	0.4 MΩ
Voltage gain	g	5.15 Neper

OPERATING CHARACTERISTICS (continued)

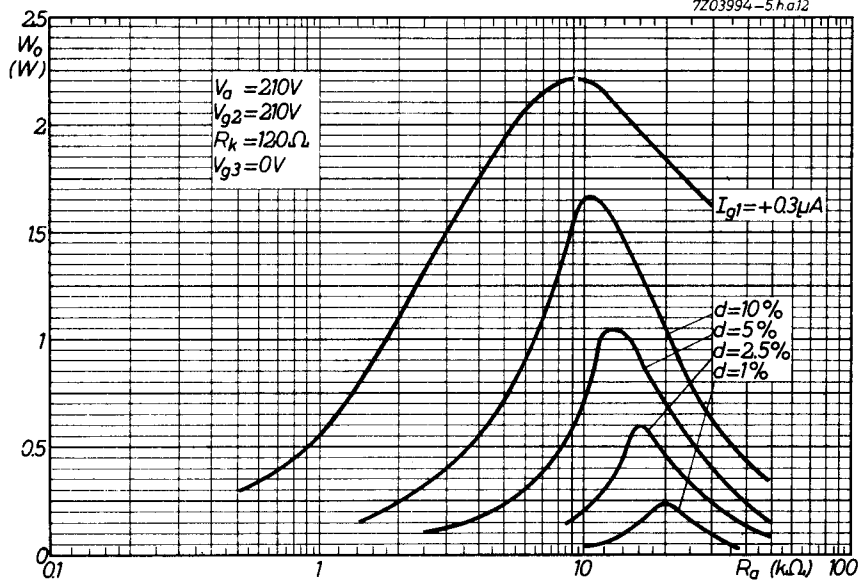
As output tube class A

Anode voltage	V_a	210 V
Grid No.3 voltage	V_{g3}	0 V
Grid No.2 voltage	V_{g2}	210 V
Cathode resistor	R_k	120 Ω
Anode current	I_a	20 mA
Grid No.2 current	I_{g2}	5.3 mA
Mutual conductance	S	11 mA/V
Internal resistance	R_i	0.3 $M\Omega$
Anode resistance	$R_{a\sim}$	15 $k\Omega$
Input voltage	V_i	0.95 V_{RMS}
Output power	W_o	1 W
Total distortion	d_{tot}	5 %

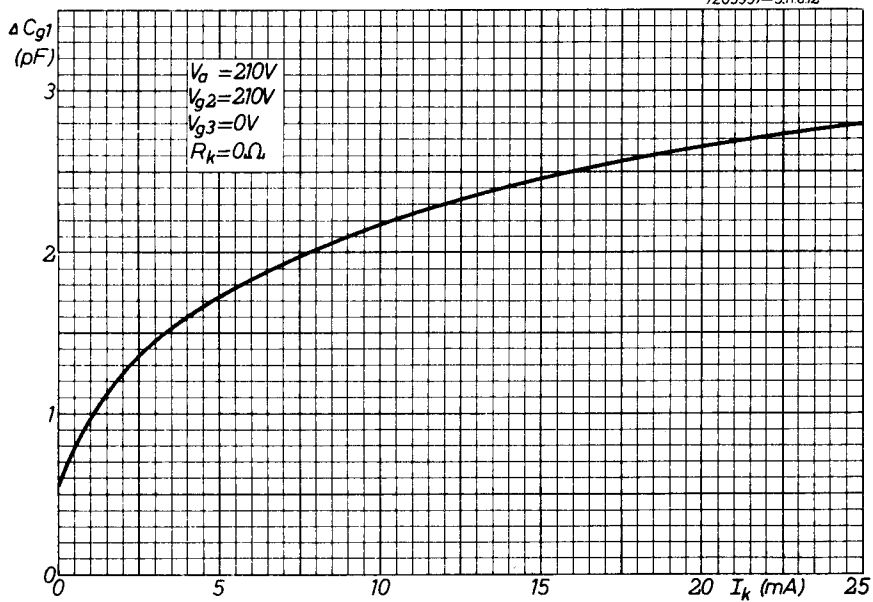




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PHILIPS

Data handbook



**Electronic
components
and materials**

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