110° RECTANGULAR
TELEVISION PICTURE TUBE

Rectangular television picture tube for direct viewing with bounded safety plate, metal backed screen, no ion trap, electrostatic focusing and 110° magnetic deflection; neck length 110 mm.

HEATING: Indirect by A.C. or D.C.; series or parallel supply

Heater voltage $V_f = 6.3$ V

Heater current $I_f = 0.3$ A

In case of series supply the surge heater voltage should not exceed 9.5 V (R.M.S.) when the supply is switched on. A current limiting device may be necessary to ensure that this voltage is not exceeded.

CAPACITANCES

Grid No.1 to all other electrodes	C_{g_1}	=	6 pF
Cathode to all other electrodes	C_k	=	4 pF
External conductive coating to final accelerating electrode	C_{m-a, g_3, g_5}	= min.	1700 pF
		= max.	2500 pF

SCREEN   Metal backed

Luminescence	white
Light transmission	50%
Useful diagonal	min. 566.5 mm
Useful width	min. 490.5 mm
Useful height	min. 387.5 mm

7Z2 2048

541.5 ± 3

70.6 ± 2.5

R = 895

R = 1278

18.5

255.5 ± 6.5

365.5 ± 9.5

min 100

99°

18.1

max 40

$28.6 {}^{+1.07}_{-0.6}$

min 490.5

R = 680

R = 397

R = 1302

R = 15.8

R = 14.33

R = 615

R = 370

114.76

35°16'

min 387.5

R = 1362

min 566.5

628 + 2

Dimensions in mm
7Z2 2049

Detail of lug of
protective panel
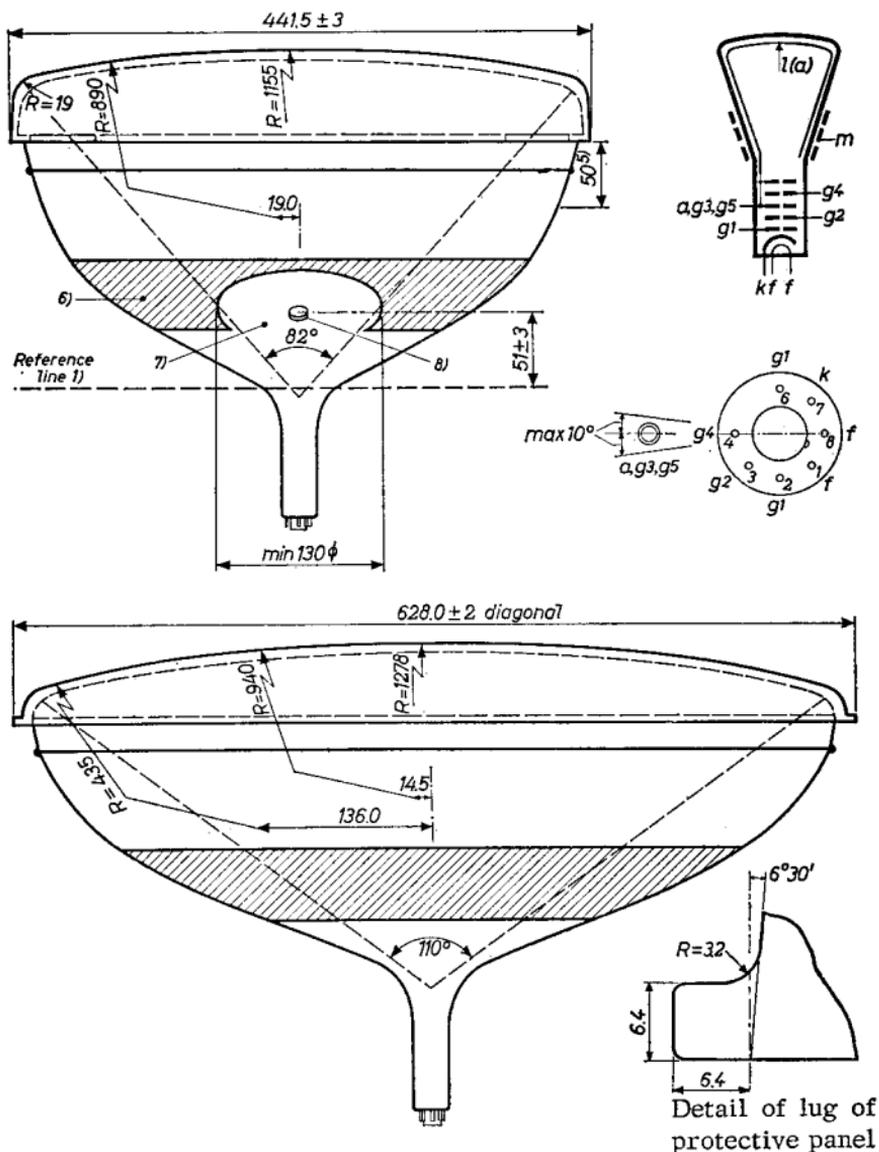
Dimensions in mm

1) --- 8) See page 7

Base : Neo Eightar

Net weight   16 kg

7Z2 2052

PHILIPS

MAXIMUM CONE CONTOUR DRAWING (dimensions in mm)

7Z2 2053

Tentative data
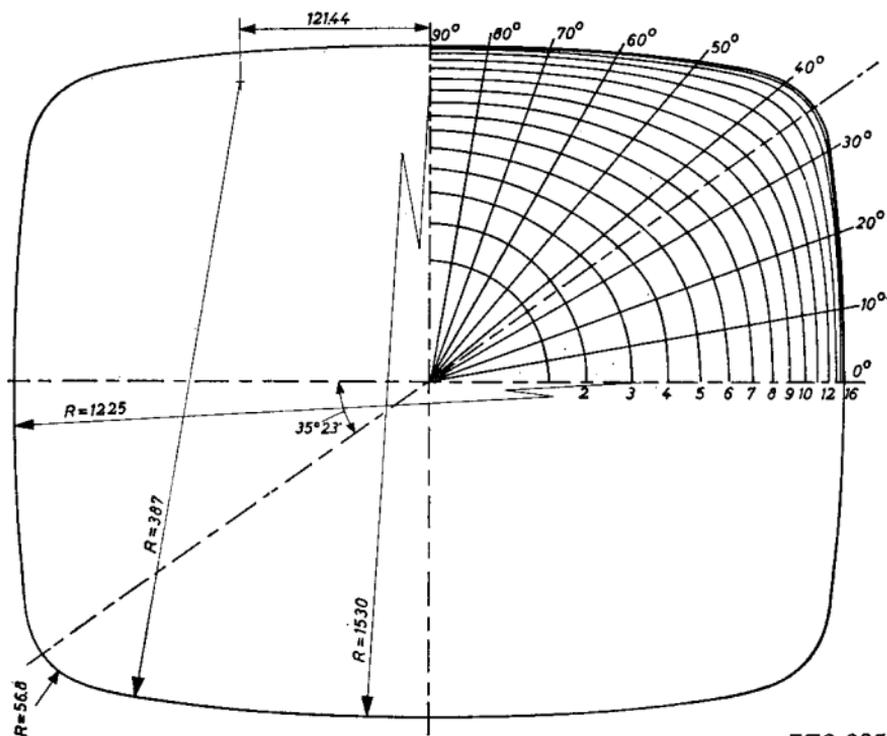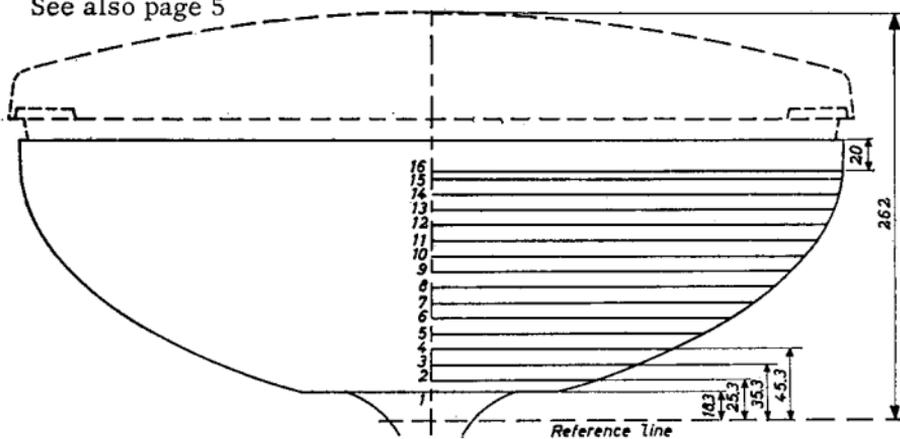
MAXIMUM CONE CONTOUR DRAWING (continued)

All dimensions (in mm) are maximum values, unless otherwise specified

Section	Nom. height above ref. line	Long axis 0°	10°	20°	30°	Dia-gonal 35°23'	40°	50°	60°	70°	80°	Short axis 90°
1	18.3	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5
2	25.3	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2
3	35.3	130.4	131.0	131.1	129.6	127.9	126.3	123.5	121.8	121.1	120.7	121.1
4	45.3	154.5	155.0	155.8	152.0	149.1	146.6	142.1	138.6	136.8	136.4	136.8
5	55.3	175.0	175.7	176.1	172.9	168.8	165.6	159.3	154.2	151.0	149.7	149.8
6	65.3	192.7	193.7	194.3	191.9	187.2	183.1	175.4	168.7	164.4	161.5	161.0
7	75.3	207.9	209.4	210.9	209.0	204.1	199.3	190.2	181.8	176.2	171.9	170.5
8	85.3	221.0	222.8	225.4	224.6	220.1	215.0	203.9	193.8	186.5	181.2	178.8
9	95.3	231.8	233.8	238.1	238.2	235.7	230.3	216.5	204.4	195.7	189.5	186.9
10	105.3	241.5	243.6	248.7	252.6	250.3	244.7	228.3	214.4	203.7	196.8	194.1
11	115.3	249.6	252.0	258.5	264.4	263.9	258.2	239.1	223.2	211.0	203.3	200.9
12	125.3	255.9	258.7	266.2	274.8	276.3	271.0	249.0	230.5	217.1	208.8	205.5
13	135.3	260.7	263.7	272.3	284.4	287.6	282.8	257.7	236.3	221.7	213.2	210.7
14	145.3	264.0	267.1	276.6	292.0	297.2	292.7	264.4	240.3	224.8	216.3	213.7
15	155.3	265.9	269.1	279.0	296.2	302.3	297.7	267.7	242.8	226.7	218.0	215.2
16	160.5	266.25	269.45	279.37	297.01	303.00	298.64	268.44	243.25	227.23	218.35	215.50

7Z2 2054

REFERENCE LINE GAUGE

Dimensions in mm
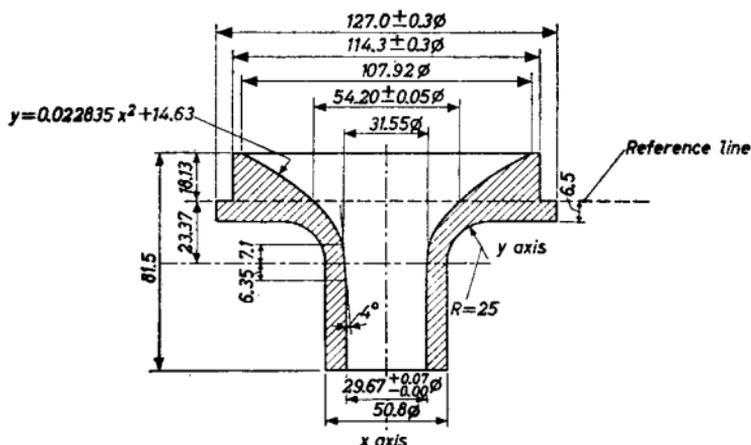
If x and y are expressed in inches, the parabolic formula for the inner contour reads $y = 0.58 x^2 + 0.576$

The reference line is determined by the plane of the upper edge of the flange of the reference line gauge when the gauge is resting on the cone.

FOCUSING   electrostatic

DEFLECTION   magnetic

        Diagonal deflection angle   110°

        Horizontal deflection angle   99°

        Vertical deflection angle   82°

PICTURE CENTRING MAGNET

Field intensity perpendicular to the axis for centring of the picture should be adjustable from 0 to 10 Oersteds.

Distance between centre of the field of the magnet and the reference line max. 57 mm.

The centring magnet should be mounted as close to the deflection coils as possible.   7Z2 2142

Mounting position: any

The socket for the base should not be rigidly mounted, it should have flexible leads and be allowed to move freely. The bottom circumference of the base wafer will lie within a circle concentric with the bulb axis and having a diameter of 40 mm.

Notes from pages 2 and 3

1) Reference line. See page 6.

2) The centre of the panel may be eccentric with respect to the tube axis. The shift of the protective panel along its minor and major axes may be max. 1.5 mm.

3) Maximum contour given by reference line gauge.

4) The four lugs of the protective panel may be used for mounting the tube. However, the restrictions made under note 5) should be observed.

5) Care should be taken that no mounting parts are in direct contact with the tube envelope unless the support is spaced from the envelope by cushioning parts.
No excessive pressure should be exerted by the support band on the splice line seal.

6) The configuration of the outer coating is optional, but contains the contact area as shown in the drawing. The external coating must be earthed.

7) This area must be kept clean.

8) Recessed cavity contact.   7Z2 2285

PHILIPS

GRID DRIVE SERVICE

Voltages are specified with respect to the cathode.

OPERATING CHARACTERISTICS

Final accelerator voltage	V_{a,g_3,g_5}	=	18	18 kV
Grid No. 2 voltage	V_{g_2}	=	400	500 V
Grid No. 4 voltage	V_{g_4}	= 0 to 400	0 to 400 V [1]

Negative grid No. 1 voltage for visual extinction of focused raster	$-V_{g_1}$	= 40 to 77	50 to 93 V

LIMITING VALUES (Design centre limits)

Final accelerator voltage at $I_{a,g_3,g_5} = 0\ \mu A$	V_{a,g_3,g_5}	= max.	18 kV
Final accelerator voltage	V_{a,g_3,g_5}	= min.	11 kV [2]
Grid No. 4 voltage			
positive value	V_{g_4}	= max.	1000 V
negative value	$-V_{g_4}$	= max.	500 V
peak positive value	$V_{g_4\,p}$	= max.	2500 V [3]
Grid No. 2 voltage	V_{g_2}	= max.	550 V
		= min.	350 V
Grid No. 1 voltage			
negative value	$-V_{g_1}$	= max.	150 V
positive value	$+V_{g_1}$	= max.	0 V
peak negative value	$-V_{g_1\,p}$	= max.	400 V [3]
peak positive value	$+V_{g_1\,p}$	= max.	2 V

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[1] Voltage range necessary for optimum overall focus at $100\,\mu A$ beam current.

[2] Absolute limit.

[3] Maximum pulse duration = 22% of a cycle, but maximum 1.5 msec.

7Z2 2055

Tentative data

LIMITING VALUES (Design centre limits) (continued)

Cathode to heater voltage

cathode positive	V_{kf} (k pos)	= max. 250 V [5][6]
cathode negative	V_{kf} (k neg)	= max. 135 V [5]
peak value, cathode positive	V_{kf_p} (k pos)	= max. 300 V
peak value, cathode negative	V_{kf_p} (k neg)	= max. 180 V

CATHODE DRIVE SERVICE

Unless otherwise stated, voltages are with respect to grid No.1.

OPERATING CHARACTERISTICS

Final accelerator voltage	V_{a, g_3, g_5}	=	18	18 kV
Grid No.2 voltage	V_{g_2}	=	400	500 V
Grid No.4 voltage	V_{g_4}	=	0 to 400	0 to 400 V [1]
Cathode voltage for visual extinction of focused raster	V_k	=	36 to 66	45 to 79 V

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[1] Voltage range necessary for optimum overall focus at $100 \mu A$ beam current.

[5] In order to avoid excessive num the A.C. component of the heater to chassis voltage should be as low as possible and must not exceed 20 V (R.M.S.).

[6] During an equipment warm-up period not exceeding 15 sec V_{kf} is allowed to rise to 410 V. Between 15 and 45 seconds after switching on a decrease in V_{kf} proportional with time from 410 V to 250 V is permissible.

7Z2 2056

CATHODE DRIVE SERVICE (continued)

Unless otherwise stated, voltages are with respect to grid No.1.

LIMITING VALUES (Design centre limits)

Final accelerator voltage at

$I_{a,g_3,g_5} = 0\ \mu A$ $\quad V_{a,g_3,g_5}$ = max. 18 kV

Final accelerator voltage $\quad V_{a,g_3,g_5}$ = min. 11 kV [2]

Grid No.4 voltage

positive value $\quad V_{g_4}$ = max. 1000 V

negative value $\quad -V_{g_4}$ = max. 500 V

peak positive value $\quad V_{g_4\,p}$ = max. 2500 V [3]

Grid No.2 voltage $\quad V_{g_2}$ = max. 700 V

Grid No.2 to cathode voltage $\quad V_{g_2-k}$ = max. 550 V [4]

= min. 350 V [4]

Cathode voltage

positive value $\quad V_k$ = max. 150 V

negative value $\quad -V_k$ = max. 0 V

peak positive value $\quad V_{k_p}$ = max. 400 V [3]

peak negative value $\quad -V_{k_p}$ = max. 2 V

Cathode to heater voltage

cathode positive $\quad V_{kf}$ (k pos) = max. 250 V [5][6]

cathode negative $\quad V_{kf}$ (k neg) = max. 135 V [5]

peak value, cathode positive $\quad V_{kf_p}$ (k pos) = max. 300 V

peak value, cathode negative $\quad V_{kf_p}$ (k neg) = max. 180 V

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[2] Absolute limit.

[3] Maximum pulse duration = 22% of a cycle, but maximum 1.5 msec.

[4] At max. beam current (V_{k-g_1} = 0 V)

[5][6] See page 7.   7Z2 2057

CIRCUIT DESIGN VALUES for both grid drive service and cathode drive service

Positive grid No.4 current	I_{g4}	= max.	25 μA
Negative grid No.4 current	$-I_{g4}$	= max.	25 μA
Positive grid No.2 current	I_{g2}	= max.	5 μA
Negative grid No.2 current	$-I_{g2}$	= max:	5 μA

MAX. CIRCUIT VALUES for both grid drive service and cathode drive service

Grid No.1 circuit resistance	R_{g1}	= max. 1.5 MΩ
Grid No.1 circuit impedance	Z_{g1} (f = 50 c/s)	= max. 0.5 MΩ
Resistance between cathode and heater	R_{kf}	= max. 1 MΩ
Impedance between cathode and heater	Z_{kf} (f = 50 c/s)	= max. 0.1 MΩ

7Z2 2058

7Z01616
A59-11W

$I_{a+g3+g5}$ (µA)

Grid drive
$V_{a,g3g5} = 11–18kV$

$V_{g2}=500V$

$400V$

V_{g1} (V)

7Z01617
A59-11 W

$I_{a+g3+g5}$
(µA)

Cathode drive
Voltages with respect to g_1
$V_{a,g3,g5} = 11-18\,kV$

$V_{g2} = 500V$
400V

$V_k(V)$
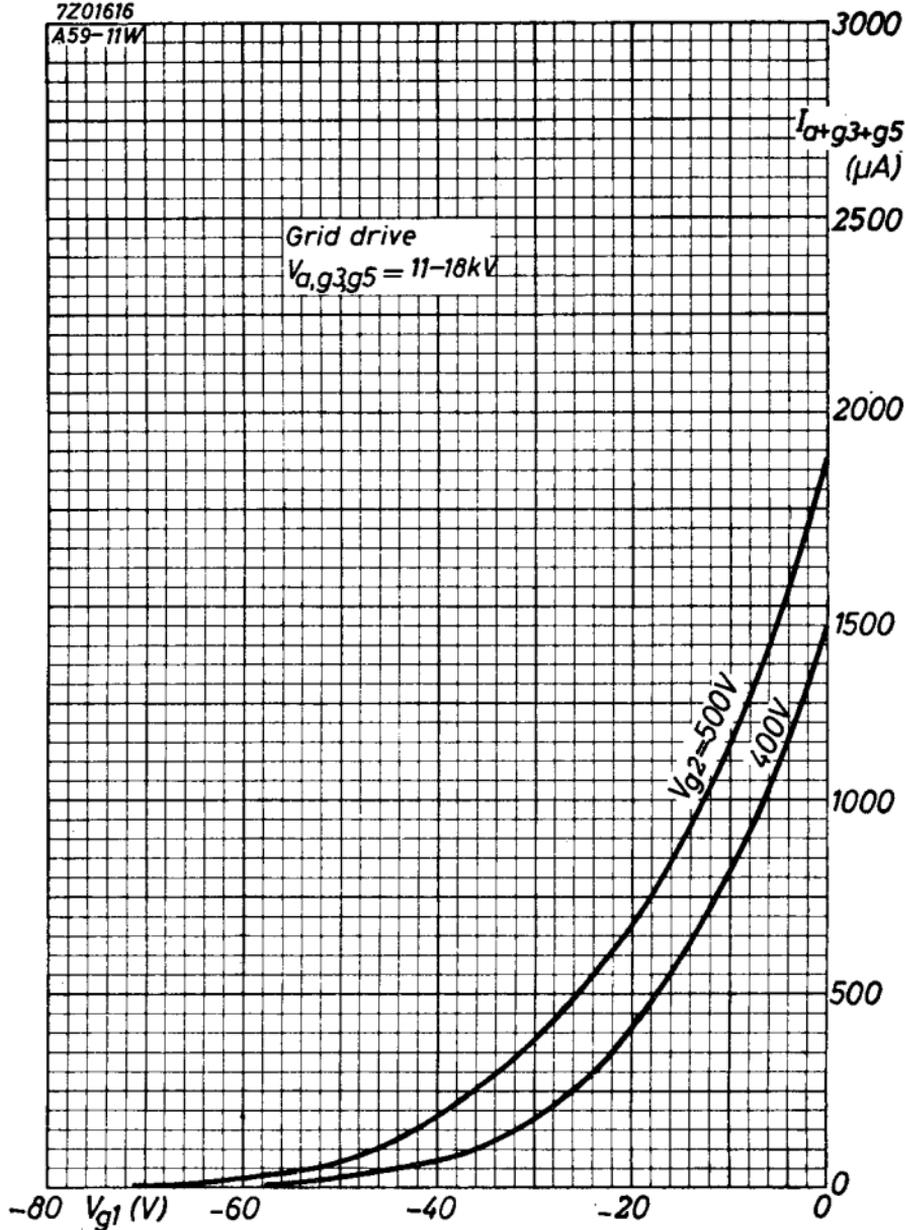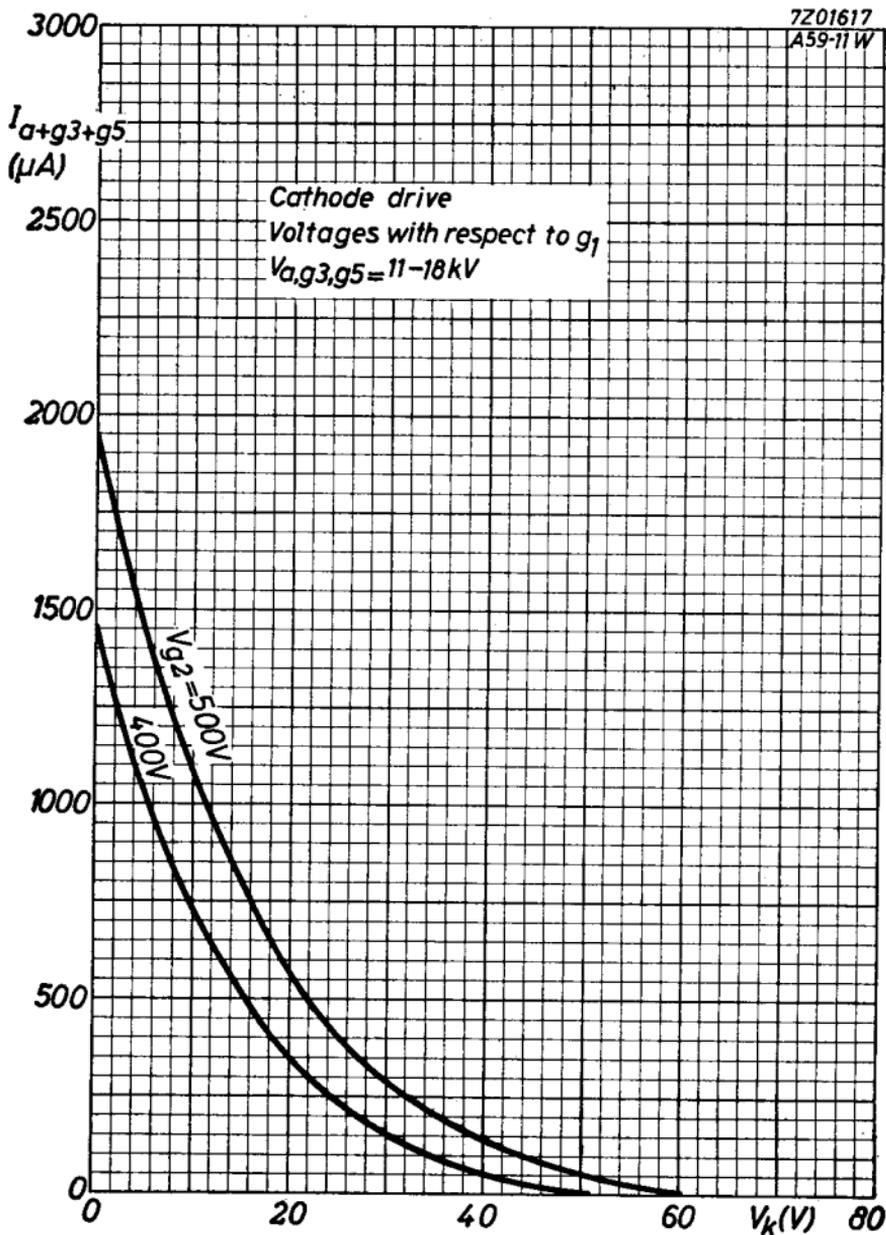
PHILIPS

Electronic Tube HANDBOOK

A59-16W