110° TELEVISION PICTURE TUBE WITH INTEGRAL PROTECTION

Direct viewing television picture tube with metal backed screen, electrostatic focusing, 110° magnetic deflection and with an integral protection against dangerous mechanical tube failures, so that no separate safety panel is required. The tube is provided with four metal mounting lugs to facilitate mounting into the cabinet.

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

If the tube is used in a series heater chain the surge heater voltage should not exceed 9.5 V (R.M.S.) when the supply is switched on. If necessary, a current limiting device must be used to ensure that this value is not exceeded.

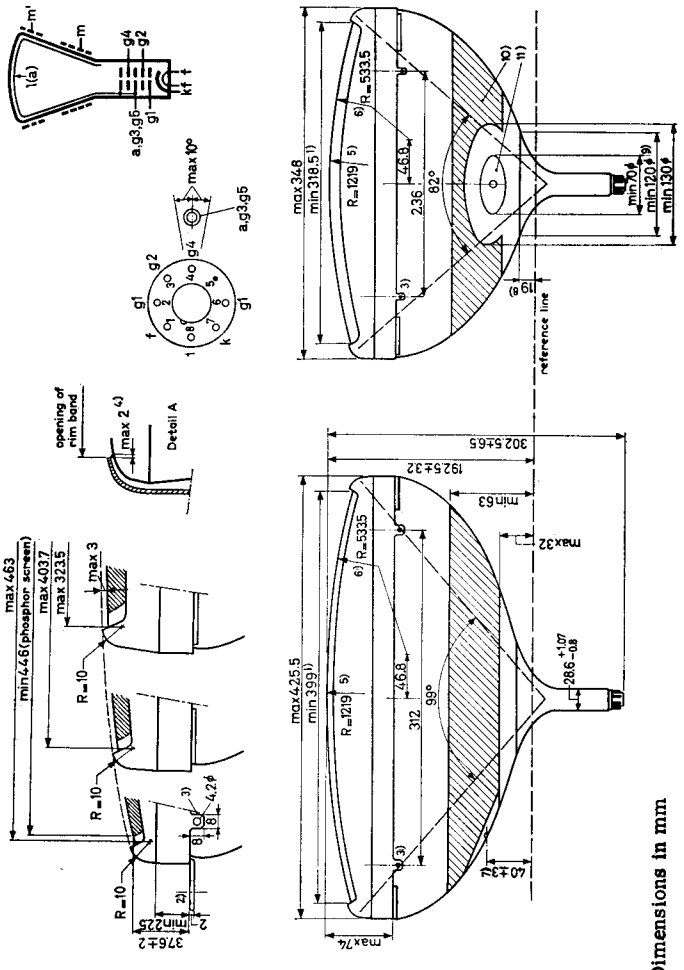
CAPACITANCES

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}	> <	1000 pF 1500 pF
Metal band to final accelerating electrode	$C_{m'-a, g_3, g_5}$	=	250 pF

SCREEN	Metal backed	
	Luminescence	white
	Light transmission	56%
	Useful diagonal	min. 446 mm
	Useful width	min. 384 mm
	Useful height	min. 305 mm

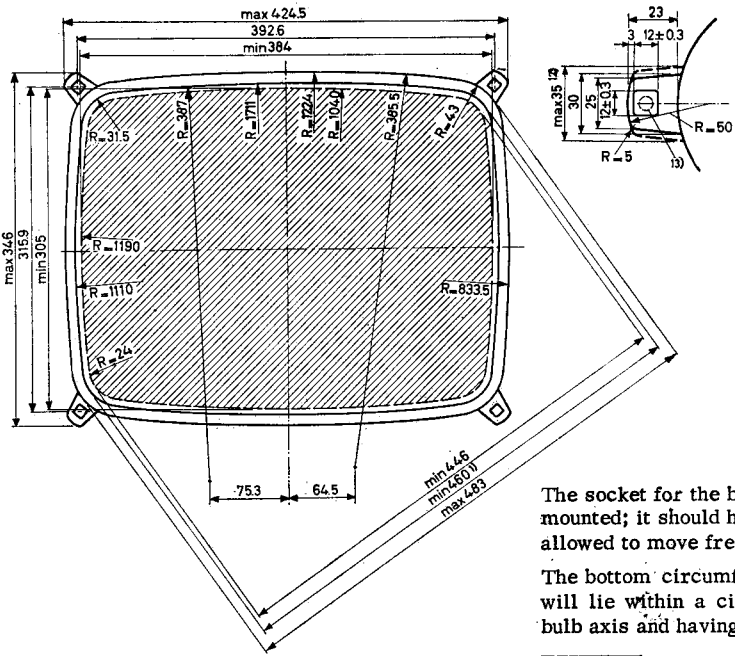
For curves of the screen properties please refer to front of this section.

7Z2 2139



Dimensions in mm

7Z2 2140



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Dimensions in mm

Base: Small-button neo eightar

Mounting position: any

Net weight 7.5 kg

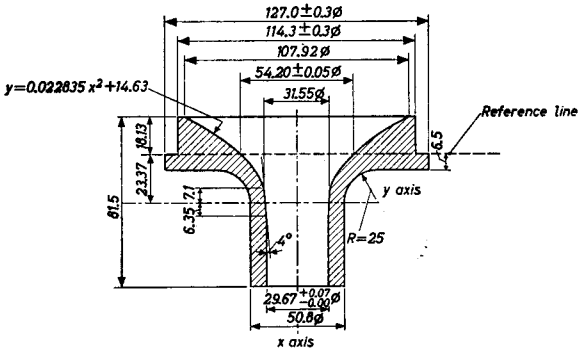
The socket for the base should not be rigidly mounted; it should have flexible leads and be allowed to move freely.

The bottom circumference of the base wafer will lie within a circle concentric with the bulb axis and having a diameter of 40 mm.

1)....13) See page 5.

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

Notes from pages 2 and 3

1) Opening of metal rim band (see detail A). Eccentricity with respect to centre of screen max. 1.5 mm.

2) The position of the mounting screw in the cabinet will be within a circle of 8.5 mm diameter.

3) Opening of coating at end of free zone.

4) Meniscus of resin filler on screen.

5) Small cavity contact.

6) End of free zone. The maximum contour from reference line towards screen is given by the reference line gauge (18.13 mm).

7) The mounting lug is situated within this distance.

8) The screen radius of 533.5 mm applies outside the centre area of the screen.

9) The screen radius of 1219 mm applies to the centre area of the screen.

10) This area must be kept clean.

11) The deviation of any lug with respect to the plane through the other three lugs is max. 2 mm.

12) 8 tags for earthing the rim band. The metal rim band must be earthed by means of these tags. No electrical contact between the band and the mounting lugs can be guaranteed.

13) The configuration of the external conductive coating is optional but contains the contact area shown in the drawing.
The external conductive coating must be earthed.

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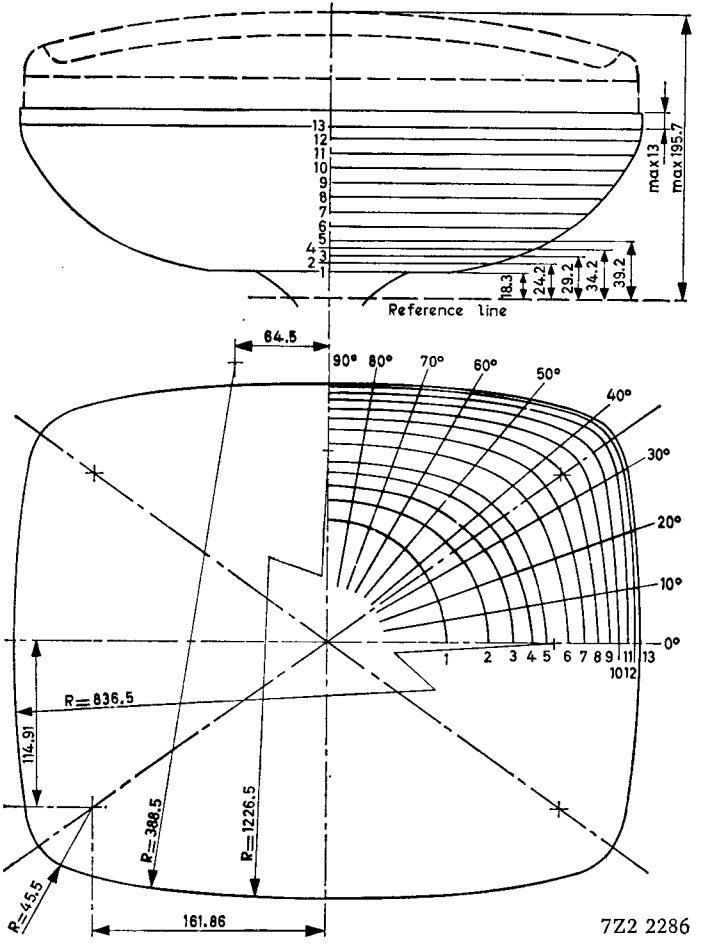
MAXIMUM CONE CONTOUR DRAWING (dimensions in mm)

See also page 7



MAX. CONE CONTOUR DRAWING (continued)

Dimensions (in mm) are given as maximum values, unless otherwise specified

Section	Nom. height above reference line	Long axis				Diagonal					Short axis
		0°	10°	20°	30°	35° 22'	40°	50°	60°	70°	80°	90°
1	18.3	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5
2	24.2	111.2	111.2	110.8	108.8	107.7	106.3	103.7	100.6	98.1	96.2	95.6
3	29.2	128.5	128.5	127.3	125.5	124.0	122.2	117.9	113.2	108.9	106.6	106.2
4	34.2	142.2	141.1	140.3	138.8	137.5	135.9	130.6	124.4	119.0	115.8	115.3
5	39.2	152.1	151.1	150.9	150.6	149.5	147.6	140.6	133.4	127.2	123.6	122.7
6	49.2	166.7	166.6	167.6	169.5	169.1	167.0	158.1	148.2	140.9	136.5	134.9
7	59.2	178.1	178.6	180.6	184.7	185.7	183.1	172.1	160.7	151.7	146.3	144.7
8	69.2	187.5	188.3	191.6	198.0	200.1	197.2	183.7	170.3	160.2	154.4	152.5
9	79.2	195.4	196.6	201.7	210.3	213.7	210.1	194.1	178.8	167.9	161.4	159.3
10	89.2	202.1	203.9	210.1	221.2	225.3	221.1	202.8	185.8	174.4	167.5	165.4
11	99.2	208.4	210.4	217.8	230.5	235.3	231.2	209.9	192.0	180.0	172.7	170.5
12	109.2	213.6	216.1	223.9	237.0	241.8	238.1	215.4	197.2	184.6	177.3	175.0
13	117.7	215.75	218.21	225.8	239.2	244.0	240.44	218.09	199.65	186.59	179.33	177.0

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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. = min.	550 V 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 μA beam current.
2) Absolute limit.
3) Maximum pulse duration = 22% of a cycle, but maximum 1.5 msec.

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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

1) Voltage range necessary for optimum overall focus at 100 μA beam current.

5) In order to avoid excessive hum 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 μA	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.	700 V	
Grid No.2 to cathode voltage	V_{g_2-k}	= max. = min.	550 V 350 V	4) 4)
Cathode voltage				
positive value	V_k	= max.	150 V	
negative value	$-V_k$	= max.	0 V	
peak positive value	V_{k_p}	= max.	400 V	3)
peak negative value	$-V_{k_p}$	= max.	2 V	
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	

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.

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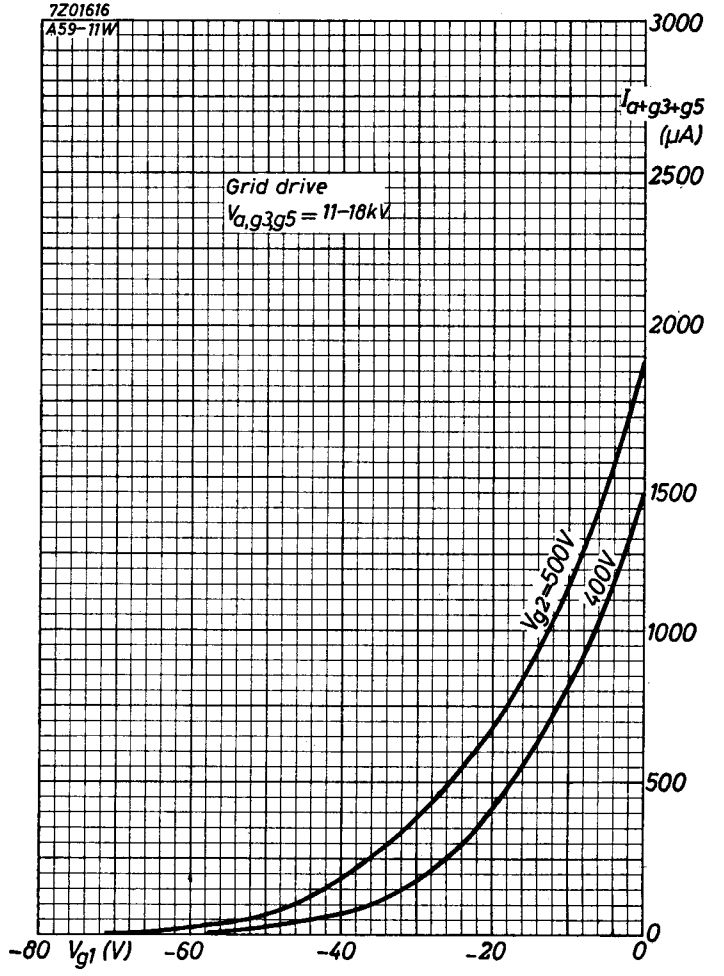
CIRCUIT DESIGN VALUES for both grid drive service and cathode drive service

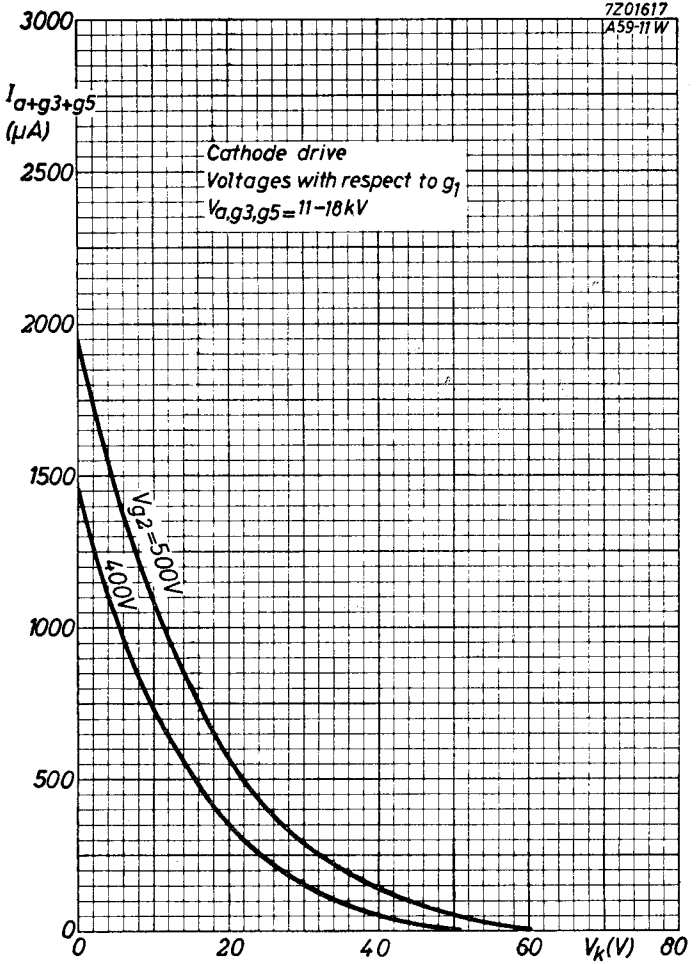
Positive grid No.4 current	I_{g_4}	= max. 25 μA
Negative grid No.4 current	$-I_{g_4}$	= max. 25 μA
Positive grid No.2 current	I_{g_2}	= max. 5 μA
Negative grid No.2 current	$-I_{g_2}$	= max. 5 μA

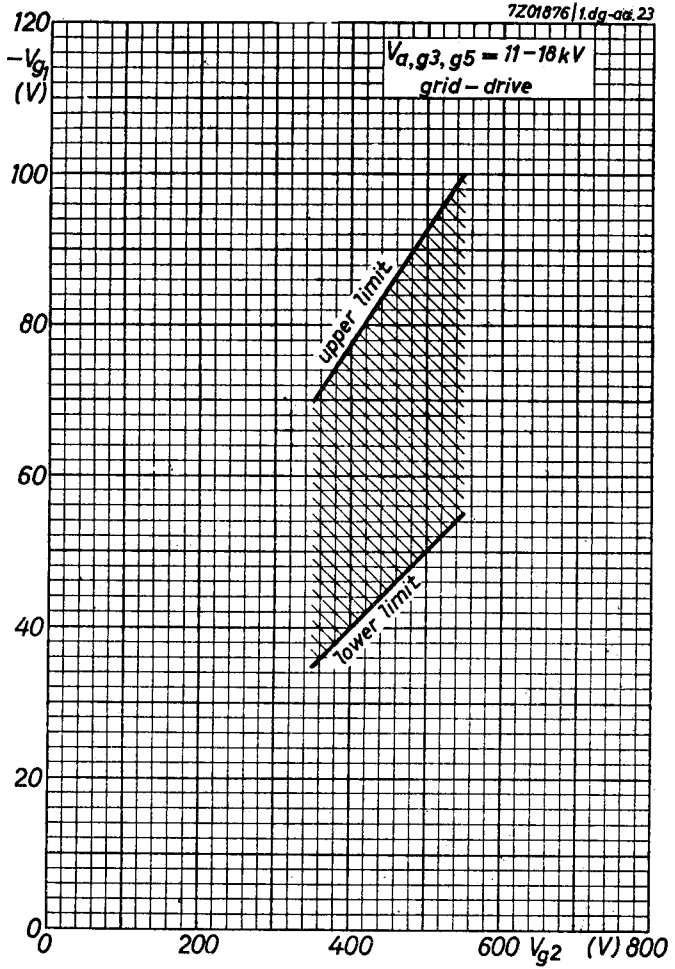
MAX. CIRCUIT VALUES for both grid drive service and cathode drive service

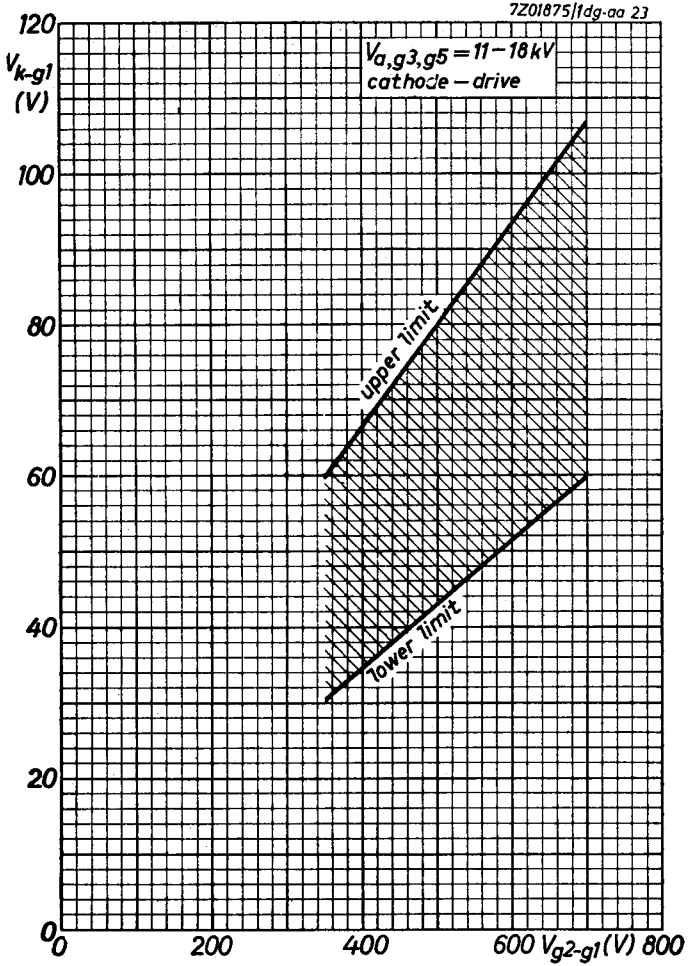
Grid No.1 circuit resistance	R_{g_1}	= max. 1.5 MΩ
Grid No.1 circuit impedance	Z_{g_1} (f = 50 c/s)	= max. 0.5 MΩ
Resistance between cathode and heater	R_{kf}	= max. 1 MΩ
Impedance between cathode and heater	Z_{kf} (f = 50 c/s)	= max. 0.1 MΩ

7Z2 2058


7Z01616
A59-11W
Grid drive
$V_{a,g3g5}$ = 11-18kV
$I_{a+g3+g5}$ (μA)
3000
2500
2000
1500
1000
500
0
V_{g2}=500V
400V
-80 V_{g1} (V) -60 -40 -20 0


7Z01617
A59-11W
3000
$I_{a+g3+g5}$ (μA)
2500
2000
1500
1000
500
0
Cathode drive
Voltages with respect to g_1
$V_{a,g3,g5}$ = 11–18 kV
V_{g2} = 500V
400V
0
20
40
60
V_k(V)
80


7Z01876|1.dg-ds.23
$V_{a,g3,g5}$ = 11 – 18 kV
grid – drive
upper limit
lower limit
120
$-V_{g1}$ (V)
100
80
60
40
20
0
0
200
400
600 V_{g2} (V) 800


7Z01875/1dg-aa 23
$V_{a,g3,g5} = 11 - 18\,kV$
cathode – drive
upper limit
lower limit
V_{k-g1} (V)
120
100
80
60
40
20
0
0
200
400
600
V_{g2-g1} (V)
800

PHILIPS

Electronic Tube

HANDBOOK

A47-11W

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