PHILIPS

DB7-78
DH7-78
DN7-78
DP7-78

OSCILLOSCOPE TUBE with flat face and post deflection acceleration by means of a helical electrode

SCREEN

Type	Fluorescence	Phosphorescence	Persistence
DB7-78	Blue	Blue	Medium short
DH7-78	Green	Green	Medium short
DN7-78	Yellowish green	Yellowish green	Medium short
DP7-78	Purplish blue	Yellowish green	Long

Useful screen diameter 68 mm

Useful scan at $V_{g6}/V_{g4} = 4$

in the x direction 60 mm

in the y direction 45 mm

For further properties of the screen please refer to front of this section

HEATING

Indirect by A.C. or D.C.; parallel supply

Heater voltage $V_f = 6.3$ V

Heater current $I_f = 0.3$ A

→ CAPACITANCES

Grid No.1 to all other electrodes	C_{g_1}	= 3.5 pF
Cathode to all other electrodes	C_k	= 2.6 pF
x_1 plate to all other electrodes except x_2 plate	C_{x_1}	= 3.5 pF
x_2 plate to all other electrodes except x_1 plate	C_{x_2}	= 3.5 pF
y_1 plate to all other electrodes except y_2 plate	C_{y_1}	= 3.0 pF
y_2 plate to all other electrodes except y_1 plate	C_{y_2}	= 3.0 pF
x_1 plate to x_2 plate	$C_{x_1-x_2}$	= 1.7 pF
y_1 plate to y_2 plate	$C_{y_1-y_2}$	= 1.6 pF

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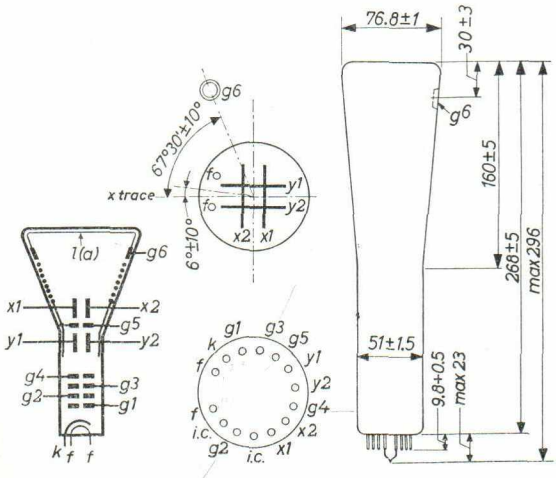
Dimensions in mm



g_5 = isolation shield

The post accelerator helix is connected between g_6 and g_5. The resistance of the helix is min. 40 MΩ

MOUNTING POSITION: any

The socket should under no circumstances be used to support the tube

ACCESSORIES

Socket 40467, supplied with the tube

Mu-metal shield 55532

Post accelerator contact connector 55563

NET WEIGHT with socket 370 g Shipping weight 1100 g

[1]) Location of the recessed cavity button contact with respect to the x trace

FOCUSING electrostatic

DEFLECTION double electrostatic

x plates symmetrical

y plates symmetrical

Angle between x and y traces $90^{o} \pm 1^{o}$

→ LINE WIDTH measured with the shrinking raster method

Post accelerator voltage	V_{g6} =	1200 V
Grid No.4 voltage	V_{g4} =	300 V
Grid No.2 voltage	V_{g2} =	1200 V
Beam current	I_{g6} =	10 µA
Line width	l.w. =	0.65 mm

→ OPERATING CHARACTERISTICS

Post accelerator voltage	V_{g6} =	1200	4000 V	
Isolation shield voltage	V_{g5} =	300 ± 30	1000±100 V	1)
Second accelerator voltage	V_{g4} =	300^{+40}_{-15}	1000± 50 V	1)
Focusing electrode voltage	V_{g3} =	20 to 150	35 to 165 V	
First accelerator voltage	V_{g2} =	1200	1000 V	
Grid No.1 voltage	V_{g1} =	-36 to -72	-30 to -60 V	2)
Modulation voltage	V_{g1p} =	max. 25	max. 25 V	3)
Deflection factor				
horizontal	M_x =	9.4 to 12	31.3 to 40 V/cm	
vertical	M_y =	3.2 to 4.1	10.7 to 13.7 V/cm	
Deviation of linearity of deflection	=	max. 2	max. 2 %	4)
Pattern distortion	=	max. 2	max. 2 %	1)5)
Undeflected spot position	R =	4	4 mm	6)

1)2)3)4)5)6) See page 4

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1) In general the voltages on g_5 and g_4 and the average potential of the deflection plates should be equal

Variation of the isolation shield voltage (max. ±10 % of V_{g_4}) serves to correct pincushion and barrel pattern distortion

A small potential difference between the y plates and g_4 may be desirable for obtaining optimum sharpness. The potential difference should be obtained by varying V_{g_4} and should not exceed ± 5 % of V_{g_4}; however, in the positive direction a variation of +40 V is allowed at low values of V_{g_4}

2) For visual extinction of the focused spot

3) Peak value of V_{g_1} above the cut-off level for I_{g_6} = 10 μA

4) The sensitivity (for both x and y plate pairs) for a deflection of less than 75% of the useful scan will not differ more than 2% from the sensitivity for a deflection of 25% of the useful scan.

5) With a raster pattern the size of which is adjusted so that the widest points of the pattern just touch the sides of a square with sides of 40.8 mm, no point of the pattern sides will be within a concentric square with sides of 39.2 mm

6) With the tube shielded the spot will be within a circle of 4 mm radius, the circle being centered with respect to the tube face

7) In order to obtain satisfactory focus quality and maximum screen current it is recommended not to apply to this electrode a voltage less than the indicated value.

8) If use is made of the full deflection capabilities of the tube, the deflection plates will intercept part of the electron beam near the edge of the scan; a low impedance plate drive is therefore desirable

9) Values to be taken into account for the calculation of the V_{g_3}-potentiometer

LIMITING VALUES (Design centre limits)

Post accelerator voltage	V_{g_6}	= max. 5000 V min. 1200 V
Isolation shield voltage	V_{g_5}	= max. 2200 V
Second accelerator voltage	V_{g_4}	= max. 2100 V = min. 300 V
Focusing electrode voltage	V_{g_3}	= max. 1000 V
First accelerator voltage	V_{g_2}	= max. 1600 V = min. 800 V 7)
Grid No.1 voltage		
negative	$-V_{g_1}$	= max. 200 V
positive	$+V_{g_1}$	= max. 0 V
peak positive	$+V_{g_1\,p}$	= max. 2 V
Ratio V_{g_6}/V_{g_4}	V_{g_6}/V_{g_4}	= max. 4
Peak voltage between second accelerator and any deflection plate	$V_{g_4\text{-}x\,p}$ $V_{g_4\text{-}y\,p}$	= max. 500 V = max. 500 V
Voltage between cathode and heater		
cathode positive	$V_{kf(k\,pos)}$	= max. 200 V
cathode negative	$V_{kf(k\,neg)}$	= max. 125 V
First accelerator dissipation	W_{g_2}	= max. 6 W
Screen dissipation	W_ℓ	= max. 3 mW/cm^2

CIRCUIT DESIGN VALUES

Grid No.1 voltage 2)	$-V_{g_1}$ = 30 to 60 V	per kV of V_{g_2}
Deflection factors at V_{g6}/V_{g4} = 1		
horizontal	M_x = 17.9 to 22.8 V/cm	per kV of V_{g_4}
vertical	M_y = 6.9 to 8.8 V/cm	per kV of V_{g_4}
Deflection factors at V_{g6}/V_{g4} = 4		
horizontal	M_x = 31.3 to 40 V/cm	per kV of V_{g_4}
vertical	M_y = 10.7 to 13.7 V/cm	per kV of V_{g_4}
Grid No.1 circuit resistance	R_{g_1} = max. 1.5 MΩ	
Deflection plate resistance	$R_x = R_y$ = max. 50 kΩ 8)	←
Grid No.3 current	I_{g_3} = -15 to +10 µA 9)	

2)7)8)9) See page 4

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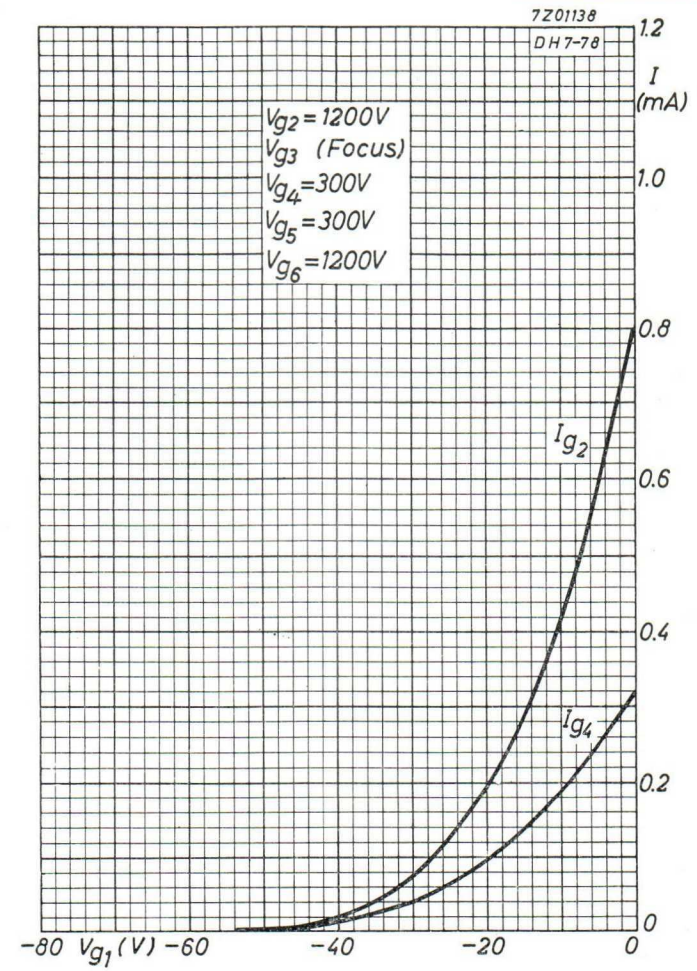

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A

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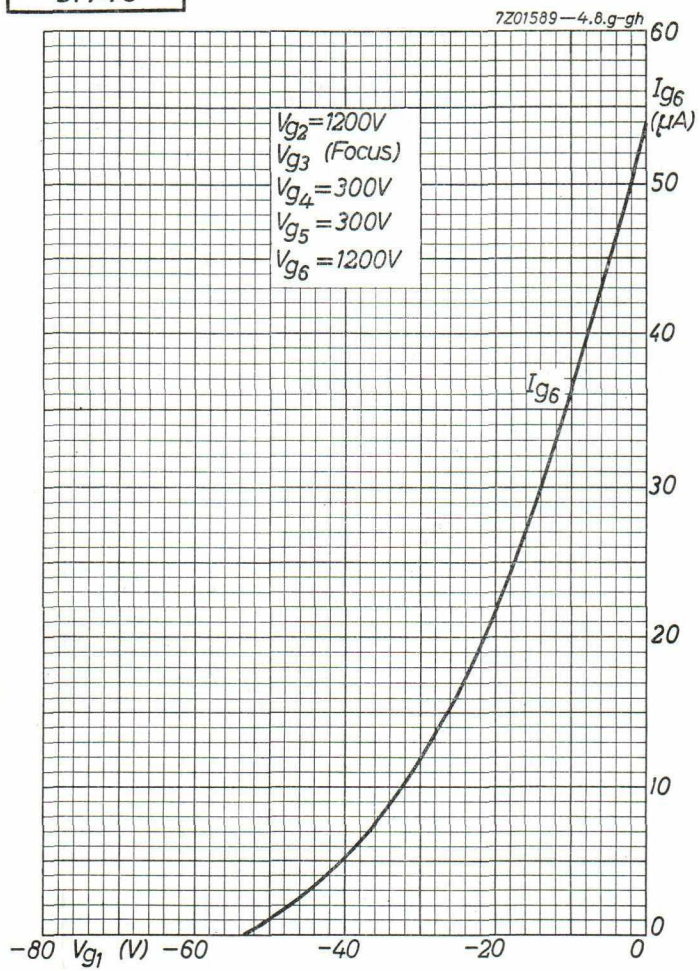
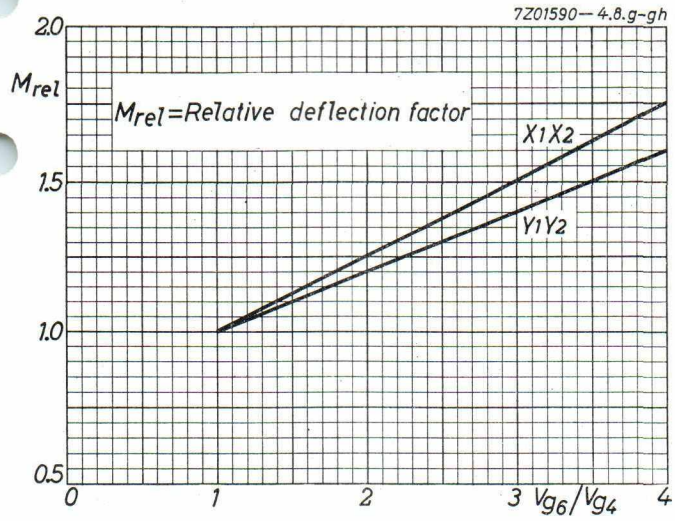
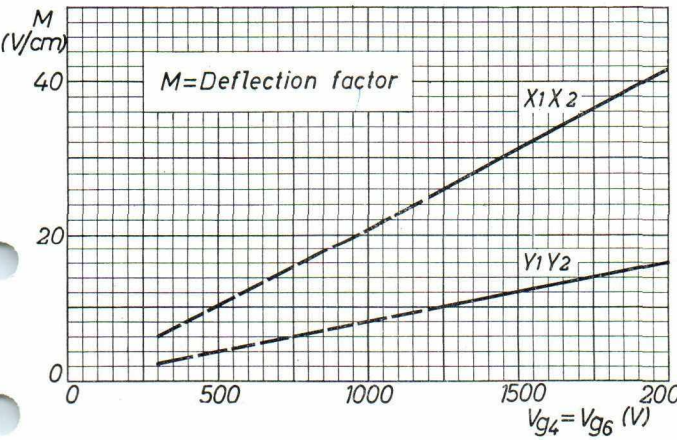


B


7Z01590—4.8.g-gh
2.0
M_{rel}
M_{rel}=Relative deflection factor
X1X2
Y1Y2
1.5
1.0
0.5
0
1
2
3
V_{g6}/V_{g4}
4


M
(V/cm)
40
M=Deflection factor
X1X2
20
Y1Y2
0
0
500
1000
1500
2000
$V_{g4}=V_{g6}$ (V)

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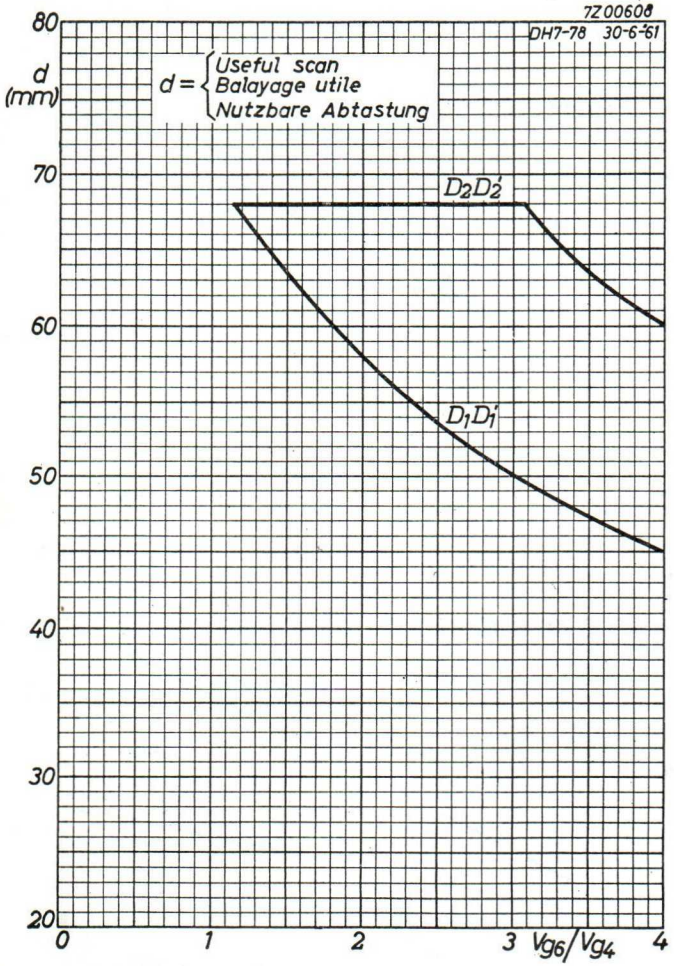
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