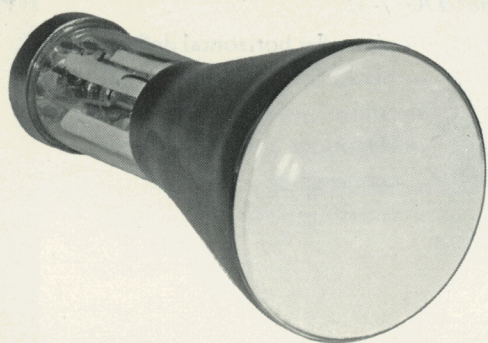
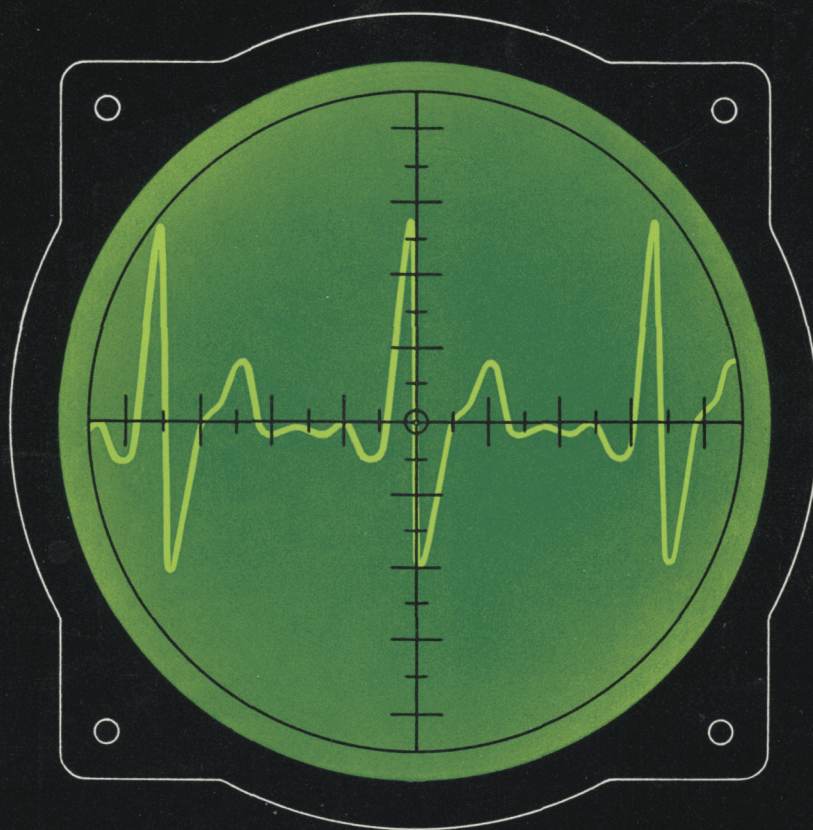


PHILIPS

CATHODE-RAY TUBES

for measuring equipment



PHILIPS ELECTRON TUBE DIVISION

LOW-VOLTAGE

Cathode-Ray Tube

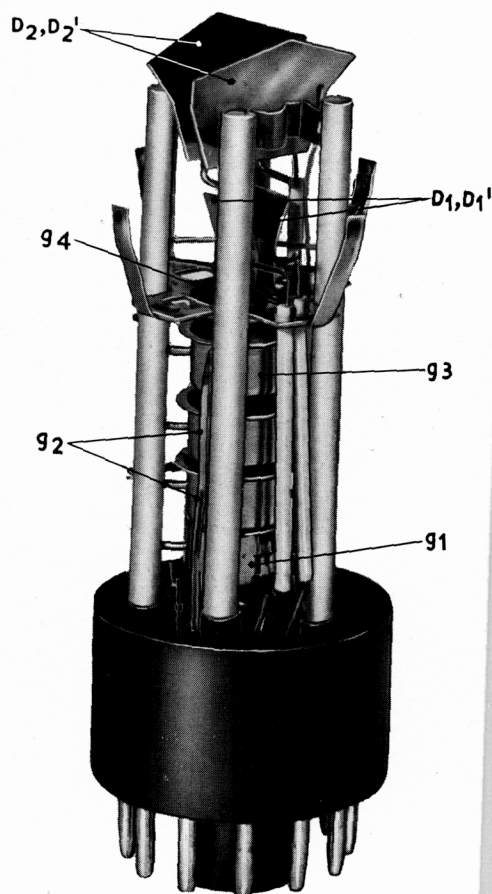
DG 7-31

PHILIPS

LOW-VOLTAGE INSTRUMENT CATHODE-RAY TUBE

DG 7-31

- 400 V final anode voltage
- Deflection sensitivity 0.4 mm/V
- Small spot size, high brilliancy, excellent contrast
- Asymmetric deflection
- Overall length only 17 cm ($6\frac{3}{4}$ ")



Electron gun of the cathode-ray tube DG 7-31

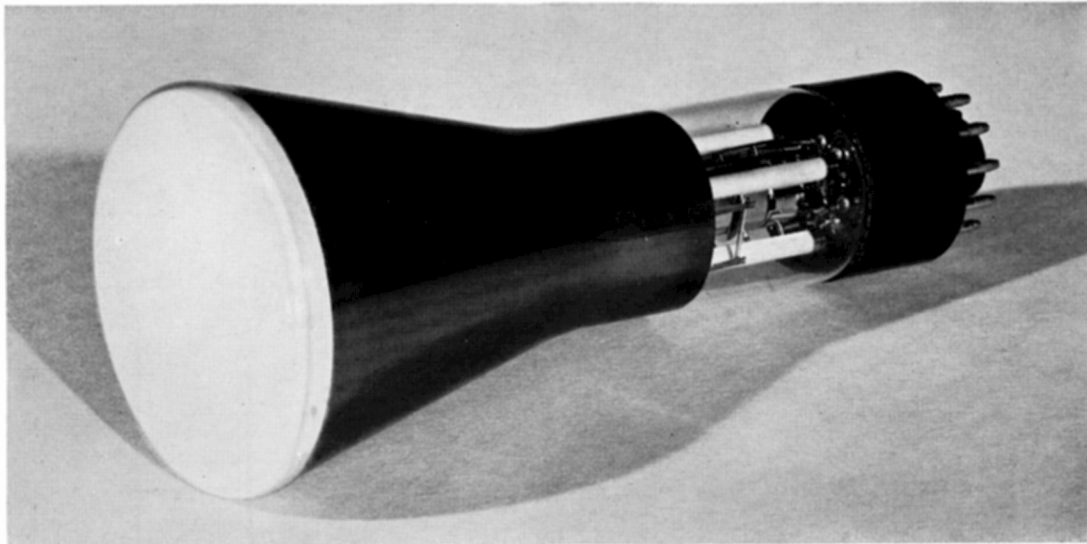
D_2D_2' — plates for horizontal deflection.

D_1D_1' — plates for vertical deflection

g_1 — control grid

g_2, g_3, g_4 — electrodes for pre-deflection acceleration

g_3 — focusing electrode



The DG 7-31 is a new type in our range of 7 cm (3'') cathode-ray tubes with characteristics making the tube particularly suitable for applications in low-cost, low-voltage, indicating instruments such as small, light-weight service oscilloscopes etc.

The type DG 7-31 has the following main features:

- Low anode voltage(400V) without screenburn or screencharge, thanks to the gun construction and a conductive layer placed in between the inner glass surface and the phosphor screen;
- High deflection sensitivity (0,4 mm/V) owing to the special design of the deflection plates;
- Asymmetric deflection; simplified design of the time base circuit;
- Fine and brilliant spot with a high contrast ratio;
- Overall length of only 17 cm (6³/₄'').

The transparent, contrast improving and conductive layer between the face and the phosphor, being connected to the final anode, gives full protection against "electrostatic body-effect" even at high operation potential.

The fine characteristics of the tube render it very suitable for a wide range of applications in the indicating instruments field.

ELECTRICAL DATA

Screen

Fluorescence: green
Persistence : medium

Heating indirect by a.c. or d.c.;
series or parallel supply

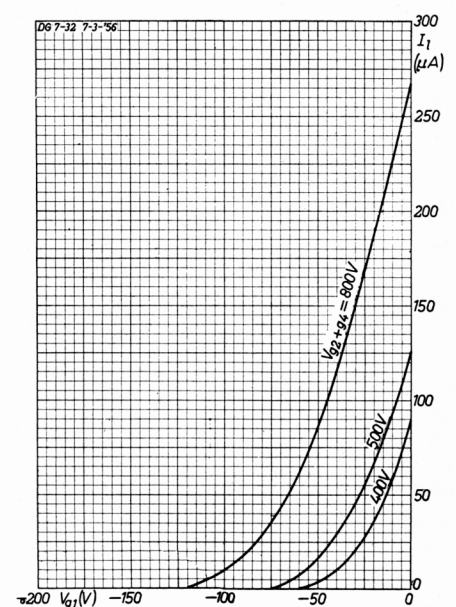
Heater voltage $V_f = 6.3$ V
Heater current $I_f = 0.3$ A

Focusing electrostatic

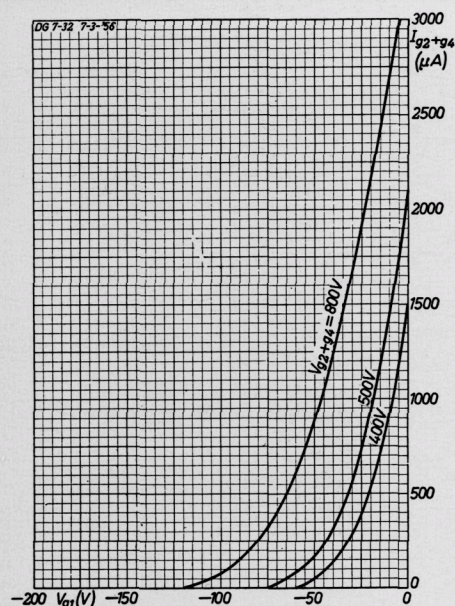
Deflection double electrostatic D_1D_1' symmetric
 D_2D_2' asymmetric ¹⁾

Line width at $V_{(g_2+g_4)} = 500$ V
 $I_l = 0.5$ μ A 0.5 mm ²⁾

¹⁾ D_2 has to be connected to g_2+g_4
²⁾ Measured on a circle of 50 mm diameter.



Screen current plotted against
negative grid No 1 voltage



Final anode current plotted
against grid cut-off voltage

INTERELECTRODE CAPACITANCES

Electrodes	Symbol	Cap. (pF)
D_1 to D_1'	CD_1D_1'	1.1
D_2 to D_2'	CD_2D_2'	1.8
D_1 to all	CD_1	2.5 ¹⁾
D_1' to all	CD_1'	2.5 ¹⁾
D_2 to all	CD_2	3.4 ¹⁾
D_2' to all	CD_2'	3.0 ¹⁾
Grid 1 to all	C_{g1}	7.6
Cathode to all	C_k	3.2

Operating characteristics

Grid No. 2 and grid No. 4 voltage	$V_{(g_2 + g_4)}$	=	500 V
Grid No. 3 voltage	V_{g_3}	=	0-120 V ²⁾
Negative grid No. 1 voltage for visual extinction of the focused spot -	V_{g_1}	=	50-100 V
Deflection sensitivity	D_2D_2'	=	0.35-0.43 mm/V
Deflection sensitivity	D_1D_1'	=	0.22-0.28 mm/V

Limiting values (design centre values)

Grid No. 2 and grid No. 4 voltage	$V_{(g_2 + g_4)}$	=	max. 800 V min. 400 V
Grid No. 3 voltage	V_{g_3}	=	max. 200 V ²⁾
Grid No. 1 voltage (negative value)	$-V_{g_1}$	=	max. 160 V
Grid No. 1 voltage (positive value)	$+V_{g_1}$	=	max. 0 V
Peak voltage on D_1D_1'	$V_{D_1D_1'p}$	=	max. 450 V
Peak voltage on D_2D_2'	$V_{D_2D_2'p}$	=	max. 750 V
Voltage between cathode and heater	V_{kf}	=	max. 125 V
Screen dissipation	W_l	=	max. 3 mW/cm ²
Grid No. 2 and grid No. 4 dissipation	$W_{(g_2 + g_4)}$	=	max. 0.5 W

Maximum circuit values

Deflection plate circuit resistance	R_D	=	5 MΩ
Grid No. 1 circuit resistance	R_{g_1}	=	0.5 MΩ

MECHANICAL DATA

Mounting position: any

Dimensions: overall length 172 mm (6³/₄"")
screen diameter 70 mm (3"")

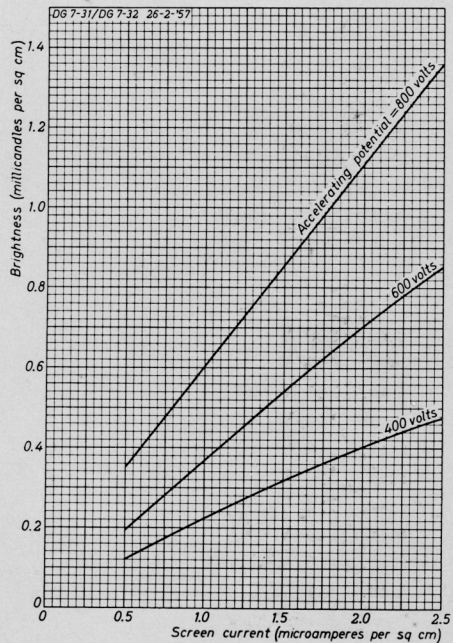
Net weight: 120 g (4.2 ounce)

¹⁾ Except the opposite deflection plate.

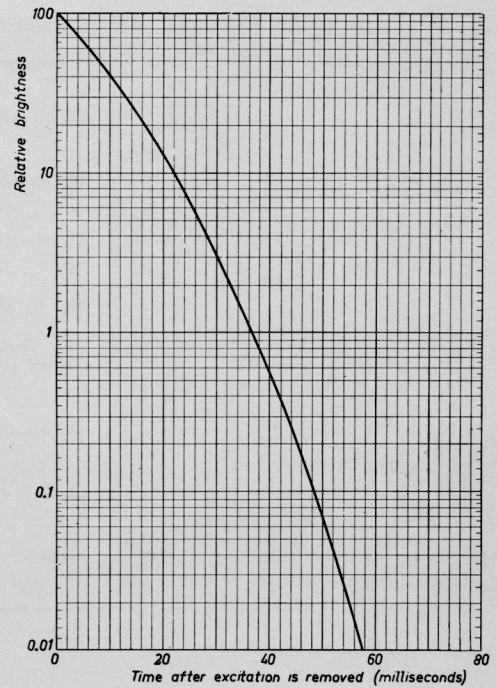
²⁾ For calculation of the grid 3 potentiometer a grid 3 current of min. -15 μA and max. +10 μA must be taken into account.

G-screen

The green fluorescent G-screen provides high visual contrast under conditions of normal ambient illumination. It has medium persistence and can be used for visual observation of recurrent phenomena in the majority of applications.

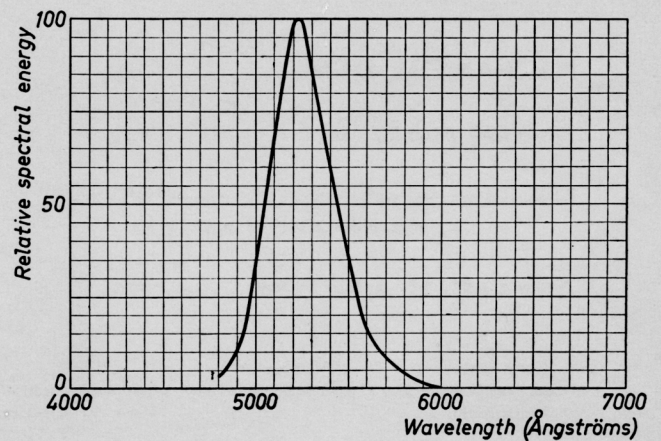


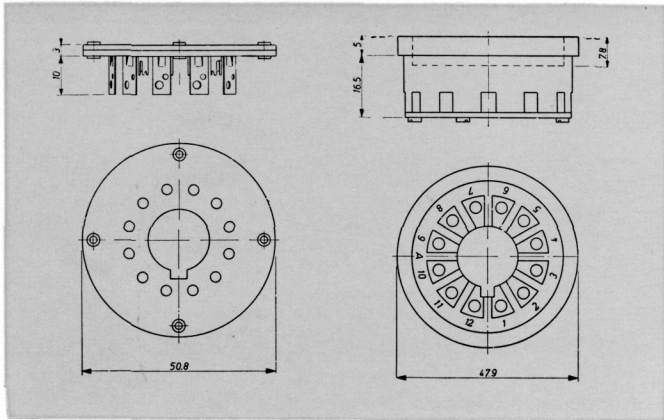
Relative spectral energy distribution of a G-screen.



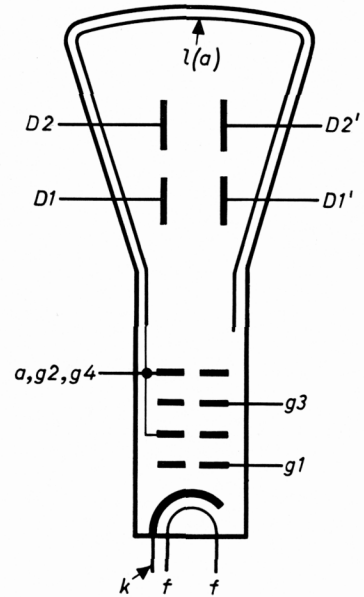
Persistence characteristic of a G-screen.

Brightness of a G-screen as a function of the screen current per square cm screen area, with the accelerating potential as a parameter.

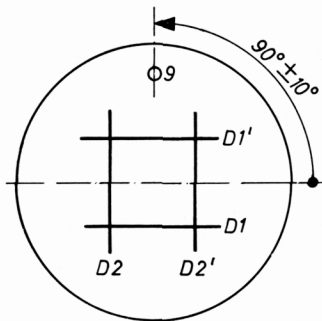




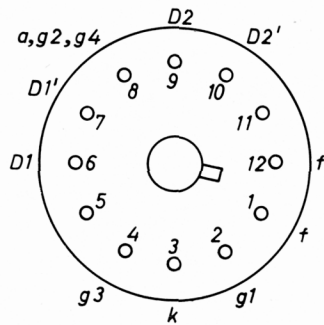
Base: duodecal 12-pins



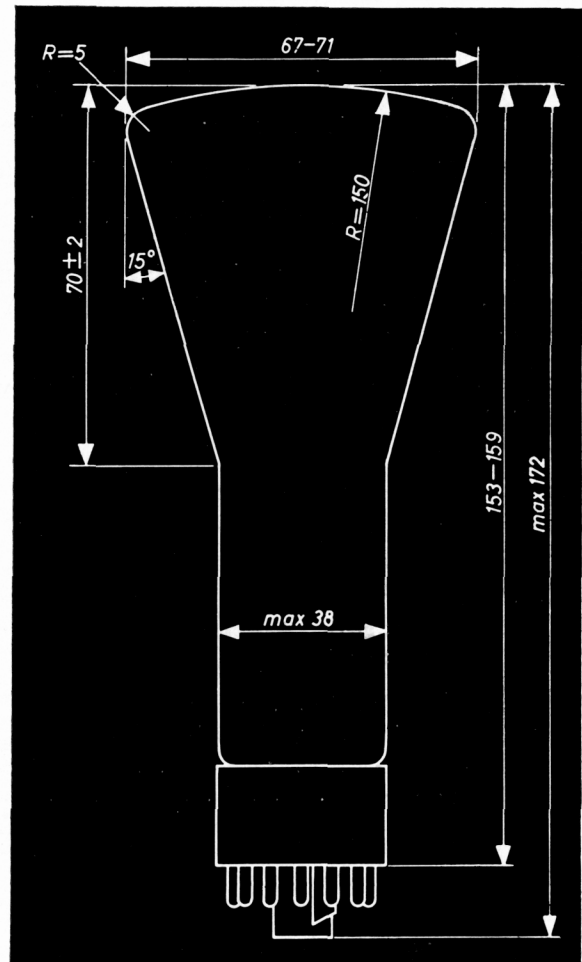
Electrode arrangement



Position of the deflection plates



Base connections



Outline drawing of the DG 7-31 (dimensions in mm)