

Information Release

PHILIPS ELECTRON TUBE DIVISION

Eindhoven, April 1957.

Dear Sirs,

We have the pleasure to introduce herewith the DG 13-34, a high-quality Cathode-Ray Tube with a plane parallel face of 13 cm (5") diameter, designed for measuring equipment.

To meet the present demand of the applications in the measuring field, this Cathode-Ray Tube has a number of outstanding characteristics: improved linearity and raster qualities as well as high deflection sensitivity and independent brightness control.

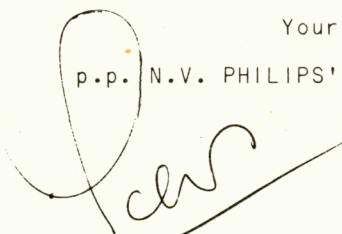
The DG 13-34 fully answers the requirements of the MIL-Specifications for the American type 5ADP1.

"Tentative Data" giving detailed electrical and mechanical information of the DG 13-34 are enclosed.

We trust that the extension of our programme with this Cathode-Ray Tube will enable you to meet still better the requirements of high-standard measuring equipment.

Yours faithfully,

p.p. N.V. PHILIPS' GLOEI LAMPENFABRIEKEN

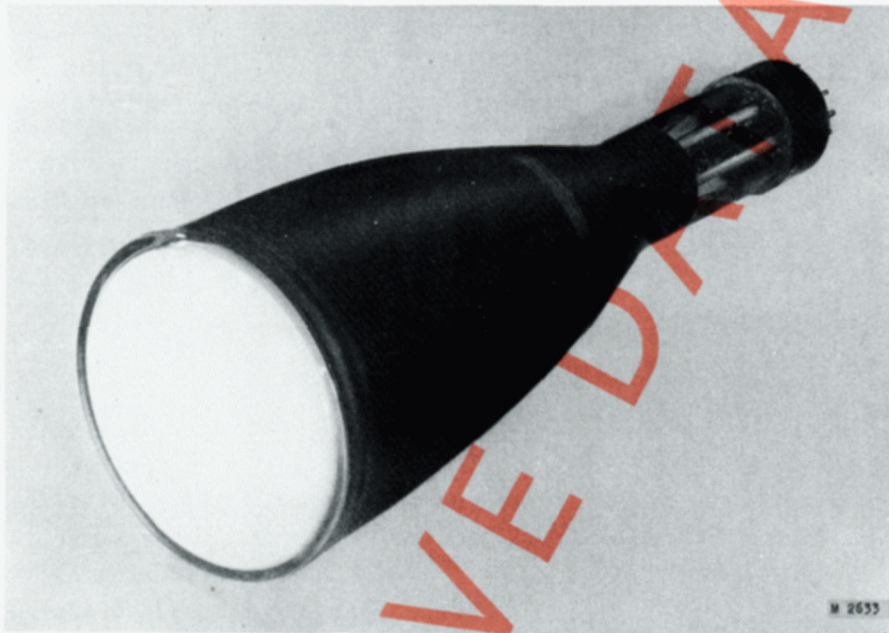


J.N. Schot



J.L. Baartman

CATHODE-RAY TUBE FOR MEASURING PURPOSES



The DG 13-34 is a high-quality Cathode-Ray Tube with electrostatic focusing and highly sensitive, electrostatic double-symmetric deflection.

The tube has especially been designed for use in applications where close tolerances in the electrical and mechanical characteristics are of prime importance.

In addition the DG 13-34 has the following features:

- Very high deflection sensitivity, permitting the use of small amplifiers, both for the timebase and the signal under examination.
- The plane parallel faceplate of high-quality glass ensures correct reading, drawing or photographic recording of the oscillograms without parallax.
- The focusing adjustment is completely independent of the brightness control, as the electrostatic focus electrode does not influence the beam current, owing to the preceding and the following electrode being at a higher potential. Moreover a high resistance potentiometer can be used for adjusting the focusing potential.
- Negligible deflection defocusing and raster distortion, thanks to perfect gun design and high precision in production.
- Thanks to the high-grade phosphor screen and high-tension post acceleration, high brilliancy at small spot dimensions is achieved.

As a result of these very interesting electrical and mechanical characteristics, the DG 13-34 is an outstanding type for measuring equipment of exceptional quality.

GENERAL DATA

HEATING

Indirect by a.c. or d.c.; parallel supply

Heater voltage $V_f = 6.3 \text{ V}$

Heater current $I_f = 0.6 \text{ A}$

CAPACITANCES

D_1 to all other electrodes ¹⁾ max. 5.0 pF

D_1' to all other electrodes ¹⁾ max. 5.0 pF

D_2 to all other electrodes ¹⁾ max. 6.1 pF

D_2' to all other electrodes ¹⁾ max. 6.1 pF

D_1 to D_1' max. 1.3 pF

D_2 to D_2' max. 3.1 pF

Grid No.1 to all other electrodes max. 7.9 pF

Cathode to all other electrodes max. 5.8 pF

SCREEN

Colour green

Persistence medium

Useful diameter min. 114 mm

DEFLECTION

Double electrostatic $D_1 D_1'$ symmetrical

$D_2 D_2'$ symmetrical

Angle between $D_1 D_1'$ and $D_2 D_2'$ traces $90^\circ \pm 1^\circ$.

FOCUSING

electrostatic

LINE WIDTH

Grid No.5 voltage $V_{g_5} = 3000 \text{ V}$

Grid No.2 and grid No.4 voltage $V_{(g_2+g_4)} = 1500 \text{ V}$ ^{0.4 mm ²⁾}

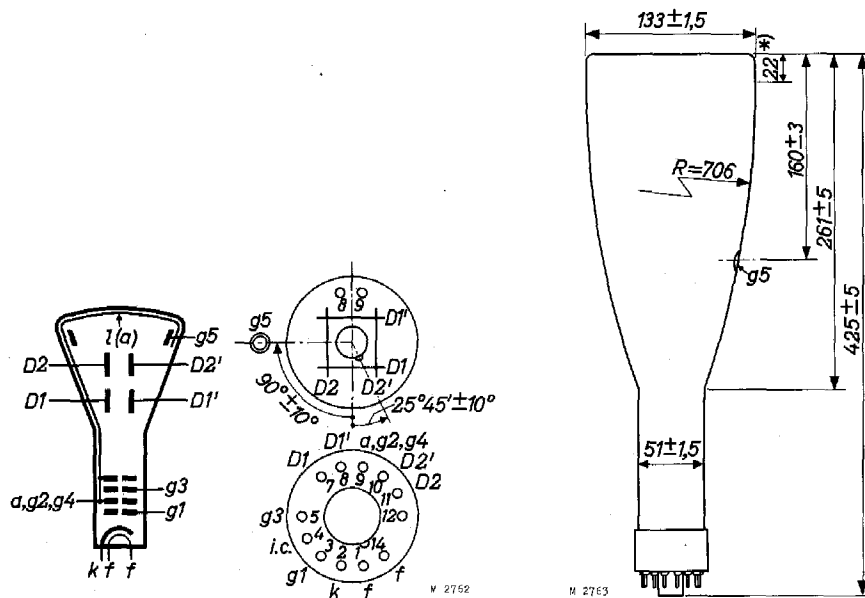
Screen current $I_1 = 0.5 \mu\text{A}$

Grid No.5 voltage $V_{g_5} = 4000 \text{ V}$

Grid No.2 and grid No.4 voltage $V_{(g_2+g_4)} = 2000 \text{ V}$ ^{0.3 mm ²⁾}

Screen current $I_1 = 0.5 \mu\text{A}$

MAXIMUM DIMENSIONS (in mm) AND ELECTRODE CONNECTIONS



*) Straight portion

¹⁾ Except the opposite deflection plate.

²⁾ Measured on a circle of 50 mm diameter.

ELECTRICAL DATA

TYPICAL OPERATING CONDITIONS

Post accelerator voltage	V_{g_5}	3000	4000 V	
Accelerator voltage	$V_{g_2+g_4}$	1500	2000 V	
Focusing voltage	V_{g_3}	300 to 515	400 to 690 V	3)+8)
Negative grid No.1 voltage for visual extinction of the focused spot	$-V_{g_1}$	34 to 56	45 to 75 V	
Sensitivity D_1D_1'	N_1	0.68 - 0.84	0.51 - 0.63 mm/V	
Sensitivity D_2D_2'	N_2	0.51 - 0.63	0.38 - 0.47 mm/V	
Useful scan D_1D_1'		min. 102	102 mm	4)
Useful scan D_2D_2'		min. 102	102 mm	4)
Deviation of the linearity of deflection		max. 2	2 %	5)
Pattern distortion		max. 2.5	2.5 %	6)
Spot position (undeflected)		7)	7)	

LIMITING VALUES (design centre)

Post accelerator voltage	V_{g_5}	max. min.	$V_{g_2+g_4}$ 6000 V	
Accelerator voltage	$V_{g_2+g_4}$	max. min.	2600 V 1000 V	
Ratio $V_{g_5}/V_{g_2+g_4}$		max.	2.3	
Focusing voltage	V_{g_3}	max.	1000 V	3)
Grid No.1 voltage				
negative value	$-V_{g_1}$	max.	200 V	
positive value	$+V_{g_1}$	max.	0 V	
positive peak value	$+V_{g_1P}$	max.	2 V	
Peak voltage between accelerator and any deflection plate	$V_{D-(g_2+g_4)p}$	max.	500 V	8)
Voltage between cathode and heater	V_{kf}	max.	180 V	
Grid No.2,4 and 5 dissipation	$W_{g_2+g_4+g_5}$	max.	6 W	

CIRCUIT DESIGN VALUES

Focusing voltage	V_{g_3}	200 to 345 V	10)
Negative grid No.1 voltage for visual extinction of the focused spot	$-V_{g_1}$	22.5 to 37.5 V	10)
Deflection factors for $V_{g_5} = 2(V_{g_2+g_4})$	D_1D_1'	0.79 - 0.98 V/mm	10)
	D_2D_2'	1.06 - 1.32 V/mm	10)
Deflection factors for $V_{g_5} = V_{g_2+g_4}$	D_1D_1'	0.64 - 0.79 V/mm	10)
	D_2D_2'	0.85 - 1.04 V/mm	10)
Grid No.1 circuit resistance	R_{g_1}	max. 1.5 MΩ	
Deflection plate resistance	R_D	max. 5 MΩ	9)

MECHANICAL DATA: see overleaf

3) For calculation of the grid No.3 voltage potentiometer a grid No.3 current of min. -15 μA and max. +10 μA must be taken into account.

4) ± 51 mm from the tube face centre.

5) The sensitivity (for both D_1D_1' and D_2D_2' plate pairs separately) for a deflection of less than 75% of the useful scan will not differ from the sensitivity for a deflection at 25% of the useful scan by more than the indicated value.

6) With a raster pattern which is so adjusted that its widest points just touch a square of 82 mm, no point of its circumference will be within an inscribed square of 78 mm.

7) With the tube shielded the spot will be within a circle of 8 mm radius that is centred with respect to the tube face.

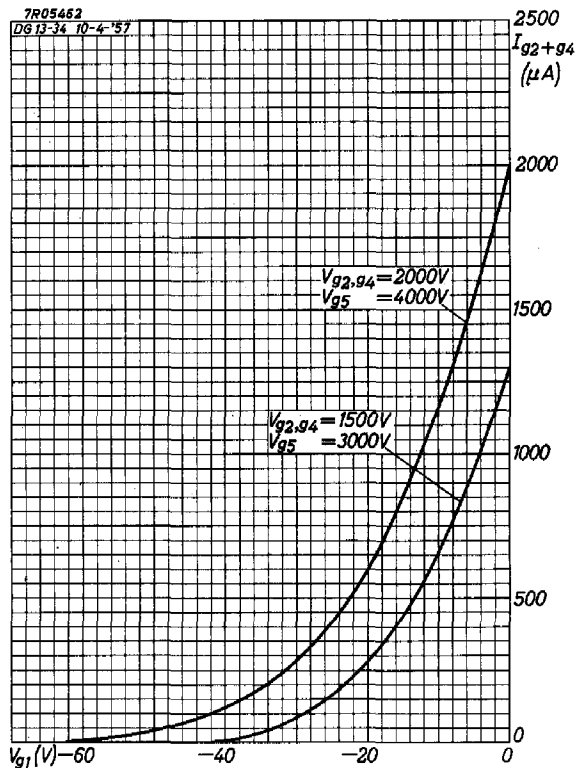
8) For optimum focus the average potentials of the deflection plates and grid No.2 and No.4 should be equal.

9) It is recommended that the deflection plate resistances are approximately equal.

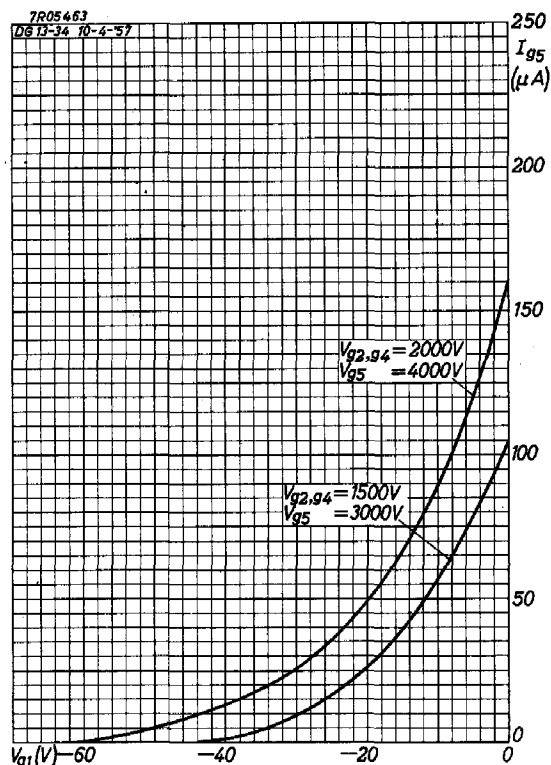
10) Per kV of accelerator voltage $V_{g_2+g_4}$.

MECHANICAL DATA

MOUNTING POSITION	Any
DIMENSIONS	Overall length 425 ± 5 mm ($16\frac{3}{4}'' \pm \frac{3}{16}''$)
	Screen diameter 13 cm (5")
NET WEIGHT	Approx. 840 g (1 lbs $13\frac{1}{2}$ oz.)
BASE	Diheptal medium shell



Grid No. 2 and No. 4 current plotted against negative grid cut-off voltage.



Screen current as a function of negative grid cut-off voltage.