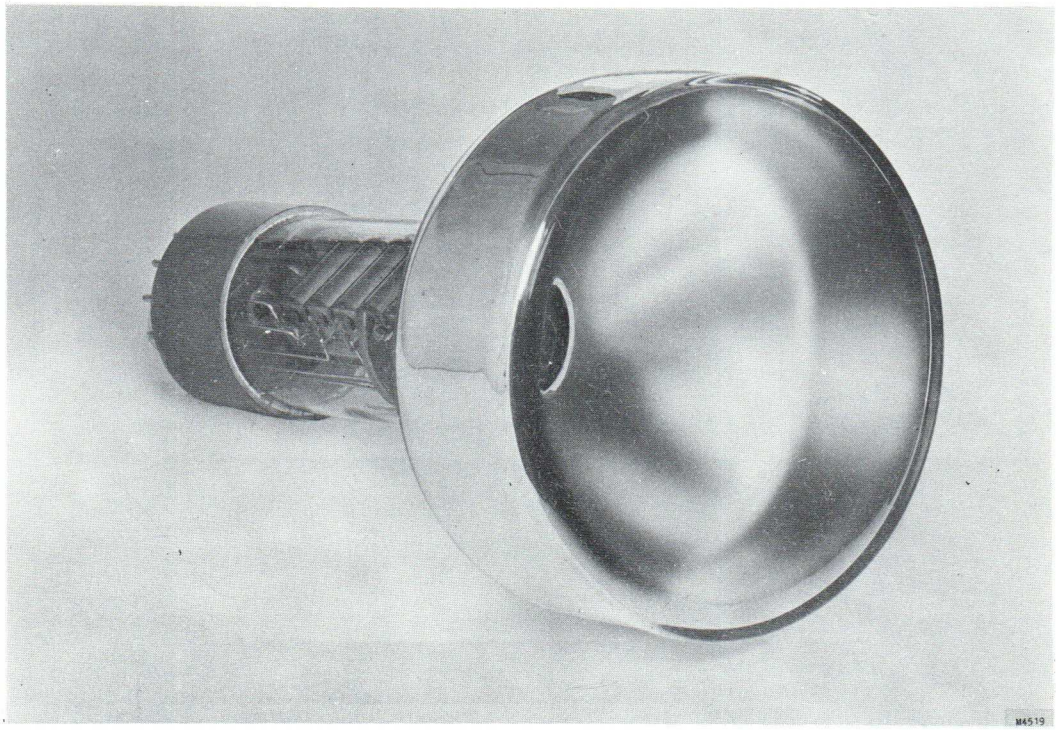
PHILIPS

54AVP

PHOTOMULTIPLIER



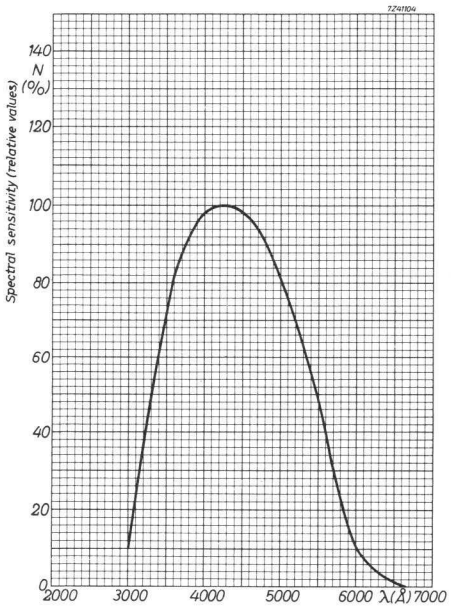
The 54AVP is an 11-stage photomultiplier tube provided with a caesium-antimony, semi-transparent flat cathode having a diameter of 111 mm. The highly sensitive uniform photocathode has a typical sensitivity of 60 μA/lm and a spectral response lying mainly in the visible region, with its maximum at 4200 Å, as shown in the spectral response curve.

The accelerating and focusing electrode has a separate external connection to allow adjustment for optimum photoelectron collection on the first dynode.

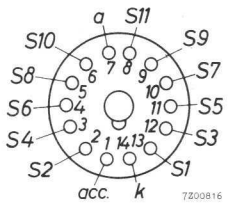
The tube is intended for use in applications such as scintillation counting with large crystals, or applications in which light must be gathered from a diffusely reflecting surface (e.g. flying-spot techniques in colour printing) or from a distant source.

The total gain of the tube is about 5.10^6 at an overall voltage of 1800 V.

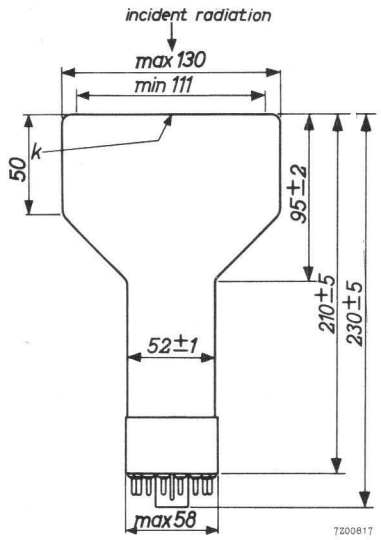
JANUARY 1962 PHILIPS' ELECTRON TUBE DIVISION



Spectral response



14-pins socket
type No. B8 700 40



Dimensions (in mm) and
electrode connections

μ-metal screening cylinder type 56129,
length 150 ± 1 mm, diameter 132 $^{+1}_{-0}$ mm

PHOTOCATHODE

Semi-transparent, head-on, flat surface			
Cathode material		SbCs	
Minimum useful diameter		111	mm
Wavelength at maximum response		4200±300	Å
Luminous sensitivity [1]		avg. 60 min. 35	μA/lm μA/lm
Radiant sensitivity [2]		min. 50	mA/W
Dark current (at t_{amb} = 25 °C)		10^{-15}	A/cm²

MULTIPLIER SYSTEM

Number of stages		11	
Dynode material		AgMgOCs	
Capacitance between anode and final dynode	C_{a-S11} =	3	pF
Capacitance between anode and all other electrodes	C_a =	5	pF

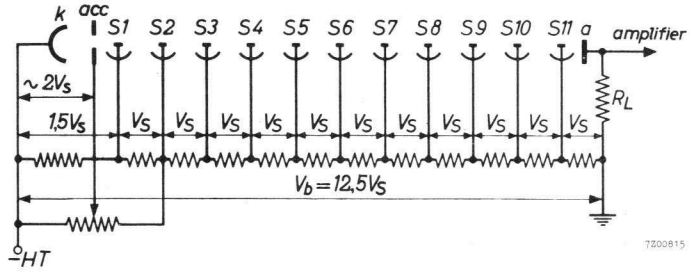
[1]) Measured with a tungsten ribbon lamp with a colour temperature of 2850 °K

[2]) At a wavelength of 4200 Å

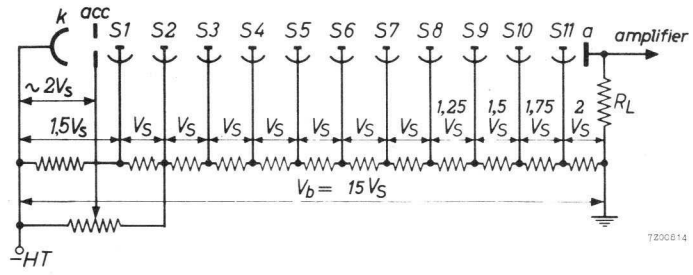
TYPICAL CHARACTERISTICS (voltage divider type A)

Anode sensitivity (at a total voltage of 1800 V)	N_a =	avg. 500	A/lm
		min. 100	A/lm
Anode dark current (at N_a = 250 A/lm)		max. 0.5	μA
Linearity between anode pulse amplitude and input-light flux:			
- with voltage divider type A		up to 30	mA
- with voltage divider type B		up to 100	mA

OPERATING CONDITIONS



Voltage divider type A [3])



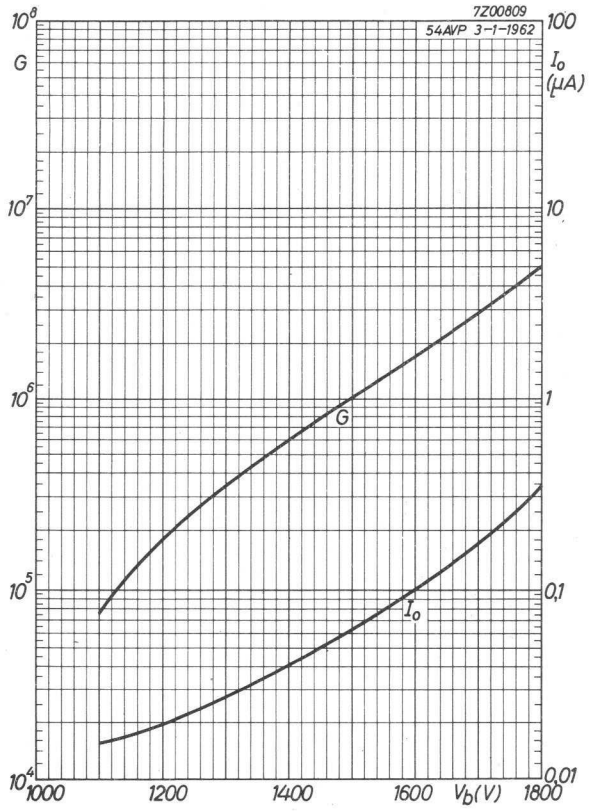
Voltage divider type B [3])

k = cathode
acc = accelerating electrode
S_n = dynode No. **n**
a = anode

LIMITING VALUES

Total voltage	V_b =	max. 2000	V
Anode current at continuous operation (in order not to overload the tube)	I_a =	max. 1	mA
Anode dissipation	W_a =	max. 0.5	W
Voltage between cathode and S_1	V_{k-S1} =	min. 120	V
		max. 500	V
Voltage between two consecutive dynodes	$V_{Sn-Sn+1}$ =	min. 80	V
		max. 300	V
Voltage between S_{11} and anode	V_{a-S11} =	min. 80	V [3])
		max. 300	V

[3]) When calculating the anode voltage the voltage drop in the load resistance R_L should not be overlooked.



Gain and dark current

OPERATIONAL CONSIDERATIONS

To achieve a stability of about 1 % the ratio of the current through the voltage-divider bridge to that through the heaviest loaded stage of the tube should be approx. 100.

For moderate intensities of radiation a bridge current of about 1 mA will be sufficient.

With the voltage divider type A the tube gives the highest gain, while with the voltage divider type B the tube can deliver higher anode currents at the cost of the total gain.

In pulse techniques, such as scintillation counting, it is advisable to decouple the last two or three stages by means of capacitors of 100 pF and 200 pF (the highest value at the last stage).

It is advisable to screen the tube with a mu-metal cylinder against the influence of magnetic fields.

Printed in Holland

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