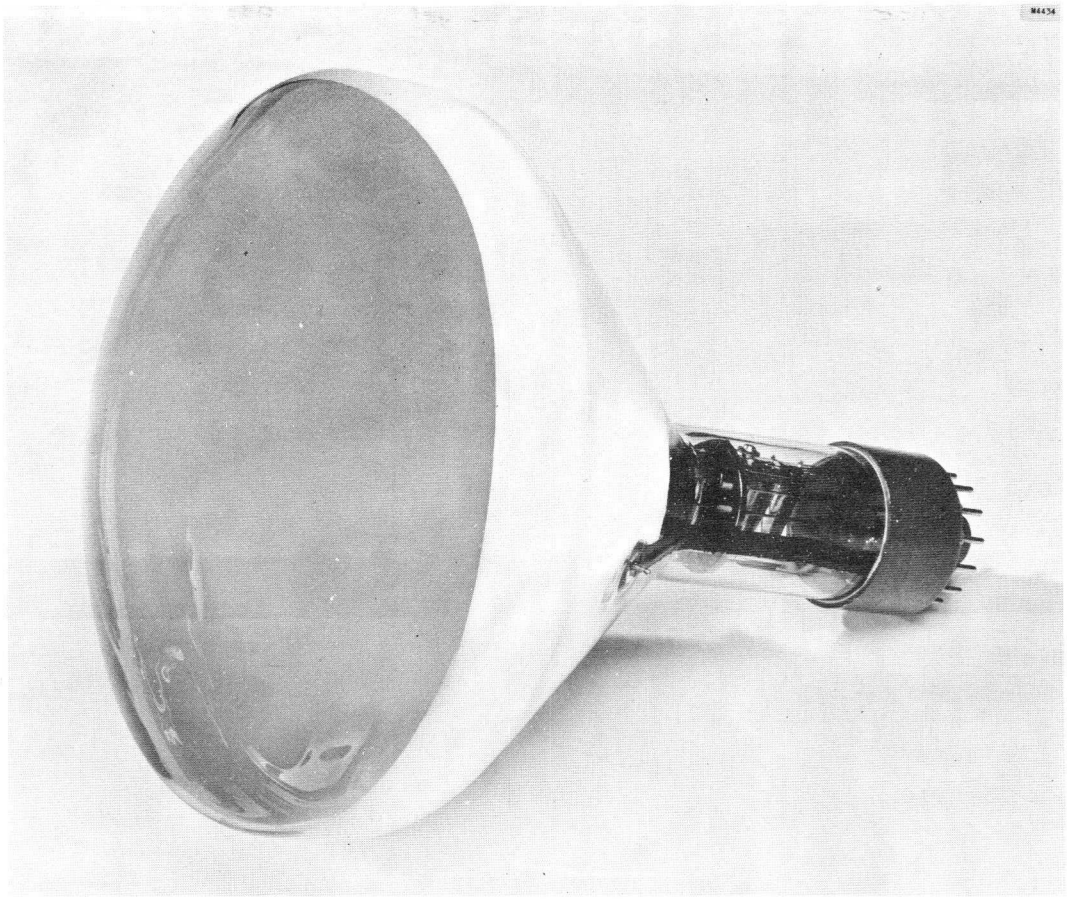
PHILIPS

57AVP

PHOTOMULTIPLIER



The 57 AVP is an 11-stage photomultiplier tube, provided with a caesium-antimony semi-transparent curved cathode having a diameter of 200 mm.

The highly sensitive uniform photocathode has a typical sensitivity of 50 μA/lm and a spectral response lying mainly in the visible region, with its maximum at 4200 Å, as shown in Fig.1.

The tube is intended for use in applications such as total body radiation measurements, uranium prospecting with very large scintillators, Cerenkov light measurements in large transparent objects.

The total gain of the tube is about 10^7 at a total voltage of 2500 V.

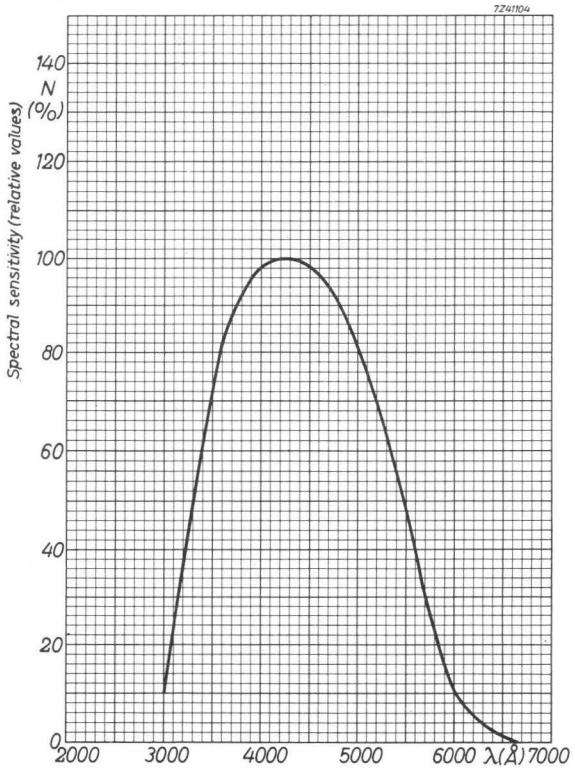
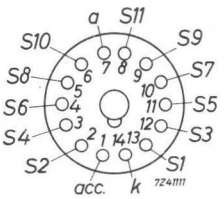


Fig. 1. Spectral response "A".

PHOTOCATHODE

semi-transparent, head-on, curved surface[1])	
radius of curvature	186 mm
cathode material	*SbCs*
minimum useful diameter	200 mm
wavelength of maximum response	4200 ± 300 Å
luminous sensitivity[2])	
average	50 μA/lm
minimum	35 μA/lm
radiant sensitivity[3])	
average	45 mA/W
dark current[4])	max. 3.10^{-15} A/cm^2



14-pin socket
type No. B8 700 40

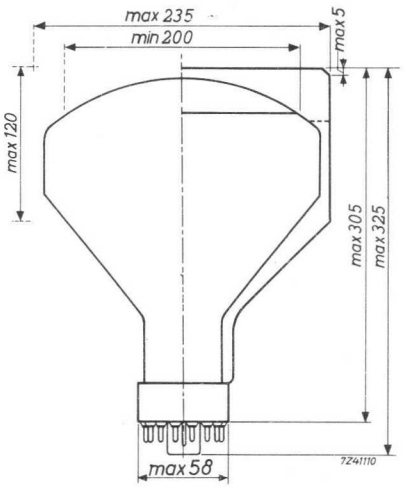


Fig. 2.

μ metal screening cylinder type 56 132; length 300 ± 1 mm; diameter 240^{+1}_{-0} mm.

For footnotes see page 3.

MULTIPLIER SYSTEM

number of stages		11
dynode material		*AgMgOCs*
capacitance anode to final dynode		3 pF
capacitance anode to all other electrodes		5 pF

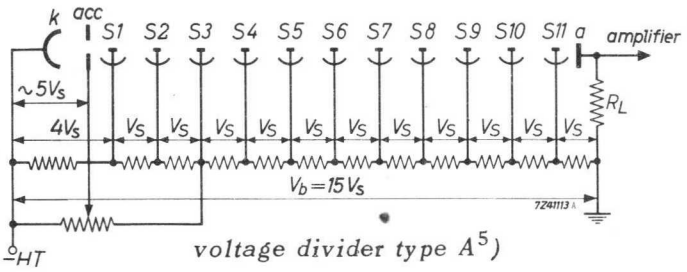
TYPICAL CHARACTERISTICS (voltage divider type A)

anode sensitivity (at a total voltage of 2500 V)	avg.	250 A/lm
	min.	60 A/lm
anode dark current (at an anode sensitivity of 60 A/lm)	max.	1 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

LIMITING VALUES

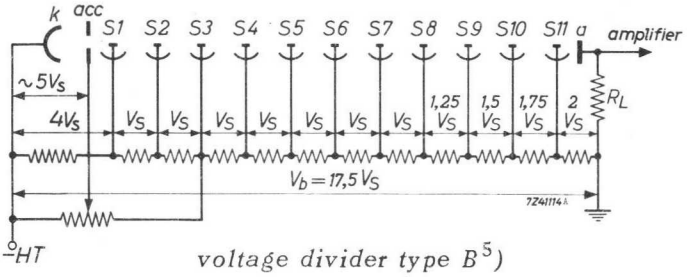
maximum total voltage		2500 V
maximum anode current at continuous operation (in order not to overload the tube)		1 mA
maximum anode dissipation		0.5 W
voltage between cathode and S_1	min.	200 V
	max.	1000 V
voltage between cathode and accelerating electrode		$\approx 5\ V_s$
voltage between dynodes	min.	80 V
	max.	300 V
voltage between S_{11} and anode	min.	80 V
	max.	300 V

OPERATING CHARACTERISTICS



voltage divider type A[5])

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



voltage divider type B[5])

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[1]) The tube is delivered with a plane-concave glass adaptor and with a metal envelope.

[2]) Measured with a tungsten ribbon lamp, having a colour temperature of 2850 °K.

[3]) At the maximum of spectral response (4200 Å).

[4]) At an ambient temperature of 25 °C.

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

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 about 100.

For moderate intensities of radiation a bridge current of about 1 mA will suffice. It is advisable to screen the tube with a mu-metal cylinder against magnetic-field influence.

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 advisible to decouple the last two or three stages with capacitors of 100 and 200 pF (the highest value at the last stage).

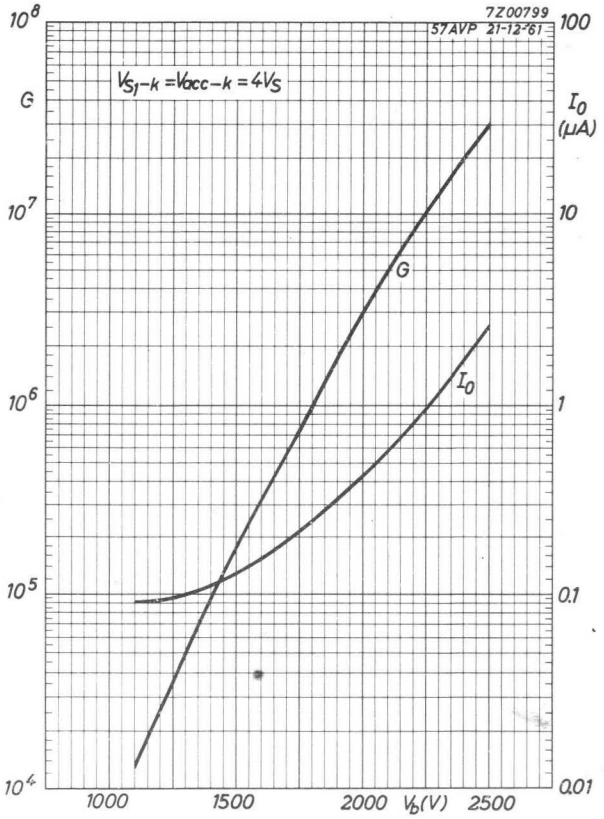

Fig. 3. Gain (G) and dark current (I_o) as a function of the total voltage (V_b).

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