The 53 AVP is an 11-stage photomultiplier tube provided with a caesium-antimony semi-transparent flat cathode, which has a diameter of 44 mm.

The highly sensitive uniform photocathode has a typical sensitivity of 60 µA/Im and a spectral response lying mainly in the visible region, with its maximum at 4200 Å, as shown in the spectral-response curve A.

The 53 UVP has the same photocathode but is provided with a quartz window, which results in a spectral response as shown in the spectral-response curve U.

The 53 AVP is intended for use in applications such as scintillation counting of α, β, γ, n radiation and X-rays, in flying-spot apparatus and different kinds of optical instruments.

The 53 UVP is intended for optical spectrometry, ultraviolet photometry and other applications which require a good sensitivity in the ultraviolet region.

The total gain of the tube is about $4 \times 10^7$ at an overall voltage of 1800 V. The dark current is less than 0.05 µA at an anode sensitivity of 60 A/Im.
PHOTOCATHODE

Semi-transparent, head-on, flat surface

Cathode material  
SbCs

Minimum useful diameter  
44 mm

Wavelength at max. response 53 AVP  
4200 ± 300 Å

Wavelength at max. response 53 UVP  
4000 ± 300 Å

Luminous sensitivity  
avg. 60 µA/lm

Radiant sensitivity  
avg. 50 mA/W

Dark current (at room temperature)  
10⁻¹⁵ A/cm²

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

2) At a wavelength of 4200 Å
MULTIPLIER SYSTEM

Number of stages
Dynode material
Capacitance between anode and final dynode
Capacitance between anode and all other electrodes

C_{a-S11} = 3 \text{ pF}
C_{a} = 5 \text{ pF}

TYPICAL CHARACTERISTICS (voltage divider type A)

Anode sensitivity
(at a total voltage of 1800 V)

N_{a} = \text{avg.} 4000 \text{ A/lm}

Anode dark current
(at an anode sensitivity of 60 A/lm)

max. 0.05 \text{ µA}

Linearity between anode pulse amplitude and input-light flux:
- with voltage divider type A
  up to 30 \text{ mA}
- with voltage divider type B
  up to 100 \text{ mA}

OPERATING CHARACTERISTICS

Voltage divider type A

Voltage divider type B

LIMITING VALUES

Total voltage
V_{b} = \text{max.} 1800 \text{ V}

Anode current at continuous operation
(in order not to overload the tube)
I_{a} = \text{max.} 1 \text{ mA}

Anode dissipation
W_{a} = \text{max.} 0.5 \text{ W}

Voltage between cathode and first dynode
V_{k-S1} = \text{min.} 200 \text{ V}

Voltage between two consecutive dynodes
V_{S_{n}-S_{n+1}} = \text{min.} 80 \text{ V}

Voltage between \text{S}_{11} and anode
V_{a-S11} = \text{min.} 80 \text{ V}

3) When calculating the anode voltage the voltage drop in the load resistance R_{L} 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 approx. 100.

For moderate intensities of radiation a bridge current of approx. 0.5 mA to 1 mA will be sufficient.

Different kinds of voltage dividers are possible. A circuit of type A results in the highest gain of the tube at a given total voltage; a circuit of type B gives higher currents in the last stages, but the total gain is less at the same total voltage.

When pulses with high amplitudes are taken from the anode, it is useful to decouple the last stages as indicated in the circuit by means of capacitors of a few hundred pF, to avoid a voltage drop between these stages.

When the tube has been exposed to full daylight just before mounting, it will probably show an increased dark current, which will be back at its normal value after several hours of operation.

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