

# PHILIPS

# 90CG

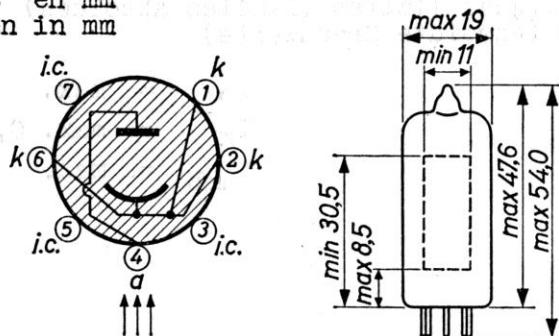
GAS-FILLED PHOTOTUBE, sensitive to red and infra-red radiation  
TUBE PHOTO-ELECTRIQUE A GAZ, sensible à radiation rouge et infra-rouge  
GASGEFÜLLTE PHOTORÖHRE, empfindlich für rote und infra-rote Strahlung

Cathode Caesium on oxidized silver  
Cathode Césium sur argent oxydé  
Katode Cäsium auf oxydiertem Silber

Projected sensitive area  
Surface sensible projetée 2,4 cm<sup>2</sup>  
Projektierte empfindliche Oberfläche

For the spectral response curve see front of this section  
Pour la courbe de réponse spectrale voir en tête de ce chapitre  
Für die spektrale Empfindlichkeitskurve siehe am Anfang dieses Abschnitts

Dimensions in mm  
Dimensions en mm  
Abmessungen in mm



Base, culot, Sockel: Miniature

The arrows show the direction of the incident radiation  
Les flèches montrent la direction de la radiation incidente  
Die Pfeile zeigen die Richtung der einfallenden Strahlung

Mounting position Arbitrary  
Montage Arbitrairement  
Einbau Willkürlich

- <sup>1)</sup> Pins 1,2,6 and 7 as well as pins 3,4 and 5 should be interconnected  
Les broches 1,2,6 et 7 ainsi que les broches 3,4 et 5 doivent être interconnectées  
Die Stifte 1,2,6 und 7 ebenso wie die Stifte 3,4 und 5 sind miteinander zu verbinden

**90 CG****PHILIPS**Capacitance  
Capacité  
Kapazität

$$C_{ak} = 0,6 \text{ pF}$$

Operating characteristics  
Caractéristiques d'utilisation  
Betriebsdaten

$$V_b = 85 \text{ V}$$

$$\begin{array}{l} \text{Dark current} \\ \text{Courant dans} \\ \text{l'obscurité (} V_a=85 \text{ V)} \\ \text{Dunkelstrom} \end{array} \left\{ \begin{array}{l} (t_{amb} = 50 \text{ }^\circ\text{C}) < 0,1 \text{ } \mu\text{A} \\ (t_{amb} = 100 \text{ }^\circ\text{C}) < 2,5 \text{ } \mu\text{A} \end{array} \right.$$

$$R_a = 1 \text{ M}\Omega$$

$$\begin{array}{l} \text{Sensitivity} \\ \text{Sensibilité (} V_a=85 \text{ V)} \\ \text{Empfindlichkeit} \end{array} = 125 \text{ } \mu\text{A/l}^1$$

Limiting values (Absolute limits)  
Caractéristiques limites (Limites absolues)  
Grenzdaten (Absolute Grenzwerte)

$$\begin{array}{l} V_b = \text{max. } 90 \text{ V} \\ I_k = \text{max. } 0,007 \text{ } \mu\text{A/mm}^2 \\ t_{amb} = \text{max. } 100 \text{ }^\circ\text{C} \end{array}$$

<sup>1</sup>) Measured with a lamp of colour temperature 2700 °K  
Mesuré avec une lampe avec une température de couleur  
de 2700 °K  
Gemessen mit einer Lampe mit einer Farbtemperatur von  
2700 °K

### GENERAL OPERATIONAL RECOMMENDATIONS

#### FOR PHOTO TUBES

##### General

Photo tubes are photo-electric devices of the emissive type, as distinct from the barrier-layer and photo-conductive cells. They may be divided into two groups:

1. High-vacuum photo tubes,
2. Gas-filled photo tubes

Each of these groups can be subdivided into red sensitive and blue sensitive photo tubes; the spectral response depending upon the photocathode material

For the blue sensitive photo tubes the "A" type of cathode is used (caesium-antimony).

For the red sensitive photo tubes the "C" type of cathode is used (caesium-oxidised silver).

Spectral response curves for each type of cathode are given at the end of these recommendations

##### Characteristics

For a vacuum photo tube, the anode current for a fixed quantity of light, is reasonably constant at anode voltages above a certain low value known as the "saturation voltage"

The gas-filled photo tube contains a quantity of inert gas, the ionising potential of which is generally somewhat higher than the saturation voltage of an equivalent vacuum photo tube so that the anode current is substantially constant between the saturation voltage and the voltage at which ionisation commences. Above this voltage range, ionisation increases, resulting in a progressive increase in anode current.

Since a gas-filled photo tube operates at a higher voltage than the ionising potential it will have a greater sensitivity than a similar vacuum photo tube.

Within the operating ranges of both groups of photo tubes the anode current is directly proportional to the quantity of light incident on the cathode surface.

##### Limiting values

The limiting values of photo tubes are absolute max. values. ←

##### Mounting

If no restrictions are made on the published data sheets of the type in question, photo tubes may be mounted in any position.

## Sensitivity

The response of a photo tube to light falling on its cathode is termed its luminous sensitivity; this is expressed in micro-amperes per lumen.

The sensitivity of all types is dependent upon the colour temperature of the light source and in some cases upon the portion of the cathode that is illuminated.

The sensitivity of gas-filled photo tubes moreover is dependent upon the anode voltage; the sensitivity of vacuum photo tubes in the "saturation region" in which region the tube mainly operates, is practically independent of the anode voltage.

Unless otherwise stated, the values given in the data sheets have been obtained by illuminating the total useful cathode area with an incandescent lamp having a colour temperature of 2700 °K

The values given for sensitivity on the data sheets are the initial values for average photo tubes. The ratio between the maximum and minimum initial sensitivity of photo tubes of a given type will not exceed 3 to 1.

## Frequency response

The sensitivity of a vacuum photo tube is constant for frequencies of light modulation up to those generally met in practice. Only at very high frequencies, at which transit time limitations occur, the sensitivity becomes dependent upon the frequency.

The sensitivity of gas-filled photo tubes, however, decreases with the frequency. At a frequency of 15,000 c/s this decrease is about 3 db, as is shown in the accompanying curve.

## Dark current

This is the current which flows between photocathode and anode when the photo tube is in total darkness. The tube is in total darkness when no radiation within the spectral sensitivity curve of the photocathode is present. This current is caused mainly by electrical leakage and thermionic emission from the photocathode and will therefore increase with temperature and voltage.

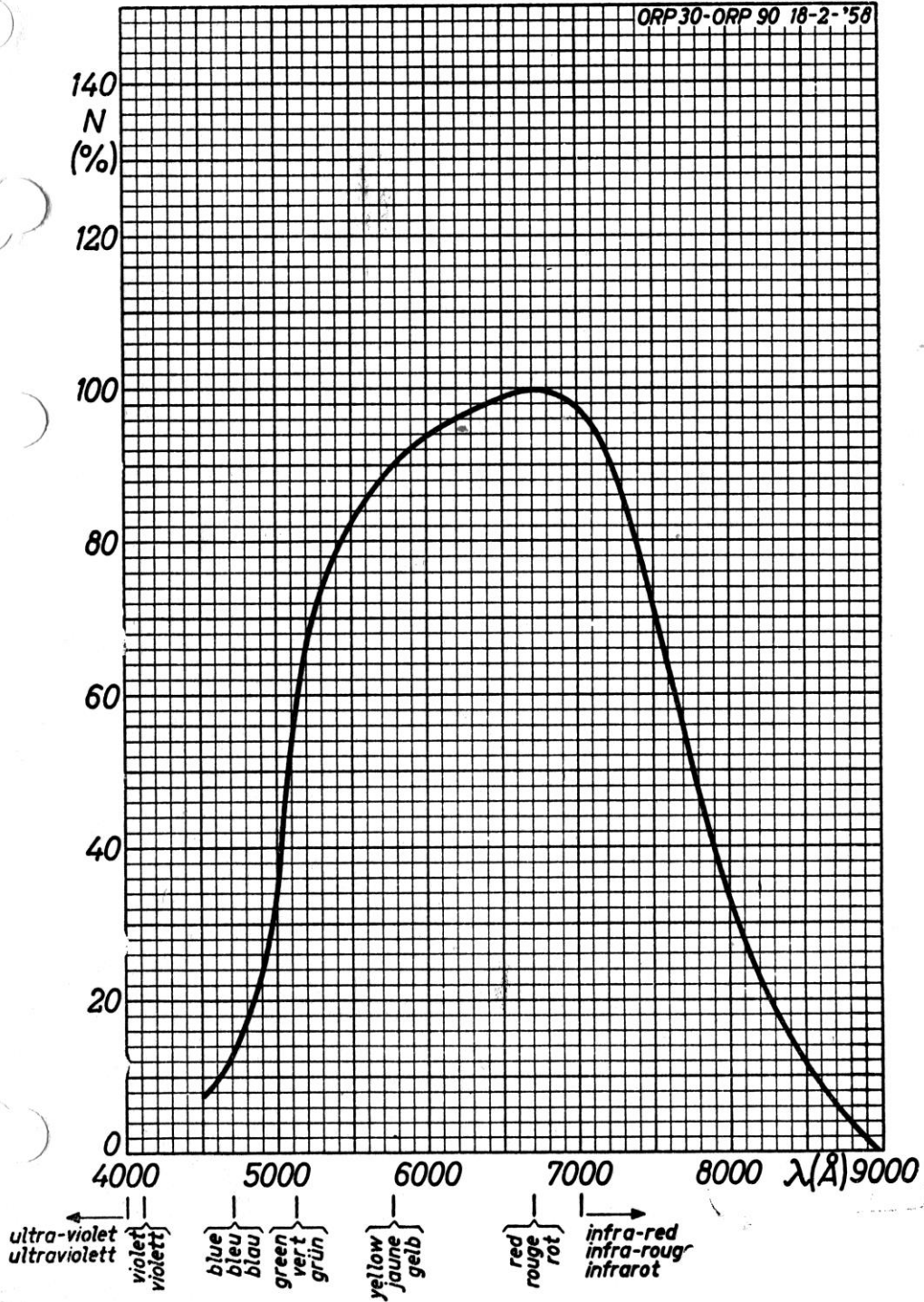
## Ambient temperature

The temperature of the photocathode may not be too high otherwise evaporation of the emissive cathode layer may result, with consequent reduction in sensitivity and life. As it is difficult to measure this temperature a limiting value for the ambient temperature is given on the published data sheet.

**Cadmium Sulfide Photoconductive Cell**  
**Cellule photoconductrice à Sulphure de Cadmium**  
**Kadmiumsulfid Photoleiter**

7R05822

ORP30-ORP 90 18-2-'58



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