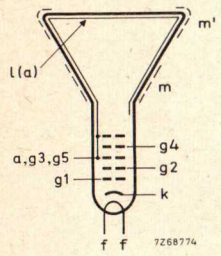
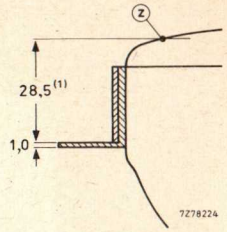
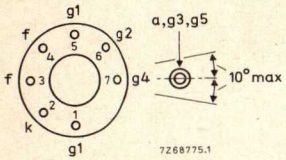
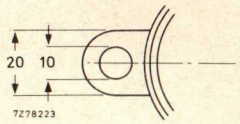








(1) If a safety panel is present, this dimension has to be increased with approx. 6,5 mm.

PHILIPS

MONITOR TUBES

- 110° deflection angle
- 31 cm (12 in) face diagonal; rectangular glass
- 28,6 mm neck diameter
- white or green screen phosphor

QUICK REFERENCE DATA

Deflection angle	110°	
Face diagonal	31 cm (12 in)	
Overall length	236 mm	
Neck diameter	28,6 mm	
	M31-300	M31-310
Heating	6,3 V/240 mA	6,3 V/300 mA
Grid 2 voltage	130 V	400 V
Cathode	quick heating	

blue binder, tab 3

APPLICATION

These monitor tubes are used for information display and data terminals, e.g. in video monitoring equipment, computer terminals, word processors.

The tubes are supplied with different screen phosphors: white (W) or green (GH and GR). They are available with safety panels, which are etched to avoid reflections of light sources.

The tubes can be supplied with additional deflection unit.

AVAILABLE VERSIONS

monitor tubes without etched safety panel without lugs	M31-300W M31-300GH M31-300GR	M31-310W M31-310GH M31-310GR
monitor tubes with etched safety panel without lugs	M31-301W M31-301GH M31-301GR	M31-311W M31-311GH M31-311GR
monitor tubes without etched safety panel with lugs	M31-302W M31-302GH M31-302GR	M31-312W M31-312GH M31-312GR
monitor tubes with etched safety panel with lugs	M31-303W M31-303GH M31-303GR	M31-313W M31-313GH M31-313GR

PHILIPS

ELECTRICAL DATA

Focusing method	electrostatic
Deflection method	magnetic
Deflection angles	
diagonal	approx. 110°
horizontal	approx. 98°
vertical	approx. 81°
Direct interelectrode capacitances	
cathode to all other electrodes,	
M31-300	approx. 3 pF
M31-310	approx. 5 pF
grid 1 to all other electrodes	approx. 7 pF
external conductive coating to anode	max. 850 pF
	min. 550 pF
Heater voltage	6,3 V
Heater current at 6,3 V	
M31-300	240 mA
M31-310	300 mA
Electron gun	
ion trap	none
focus lens	unipotential

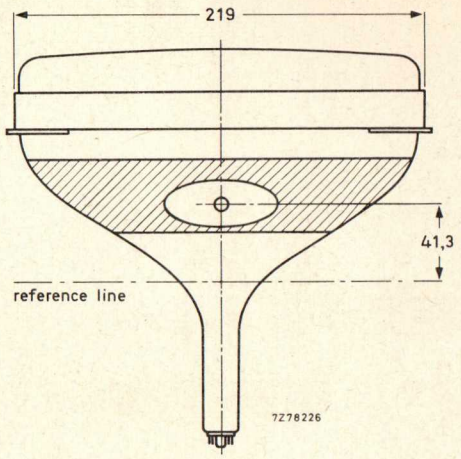
OPTICAL DATA

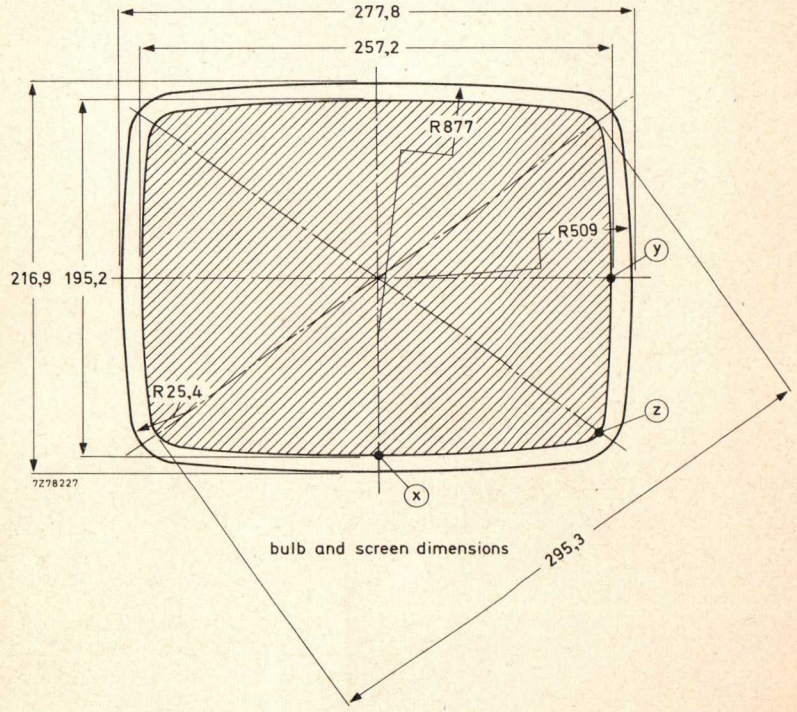
Phosphor number	W, GH and GR (P4, P31 and P39 respectively, according to JEDEC)
Light transmission at centre	
of face plate	approx. 50%
of safety panel	approx. 61%
Anti-reflection treatment	etched safety panel (if present)

PHILIPS

M31-300 SERIES
M31-310 SERIES

DEVELOPMENT SAMPLE DATA



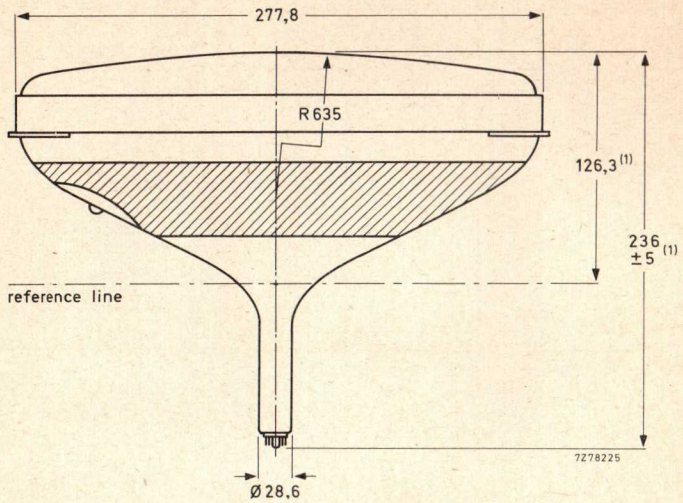


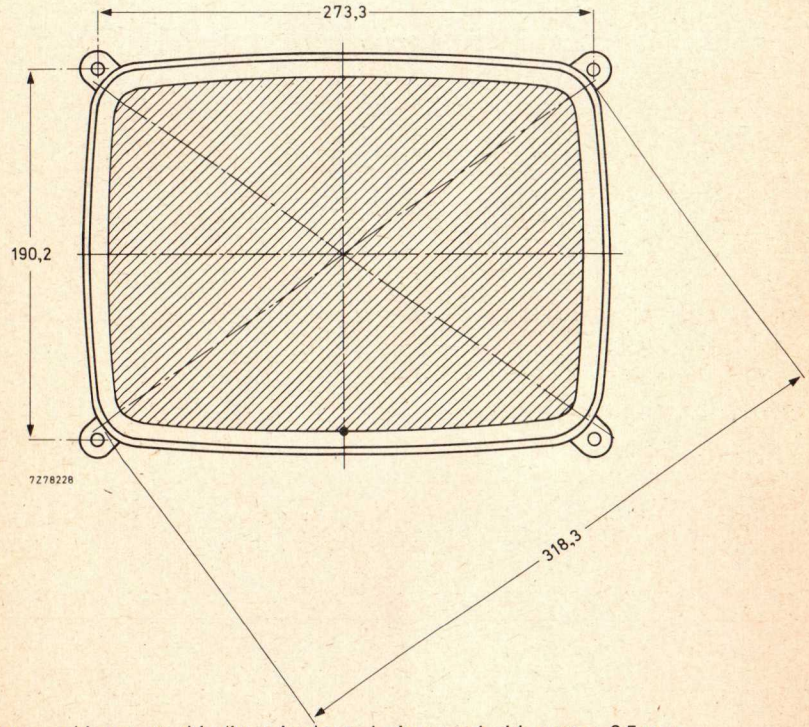
bulb and screen dimensions

PHILIPS

DIMENSIONAL DATA

Dimensions in mm





(1) If a safety panel is present, this dimension has to be increased with approx. 6,5 mm.

PHILIPS

DEVELOPMENT SAMPLE DATA

MECHANICAL DATA (see also the figures on pages 10 and 11)

Overall length	236 ± 5 mm
Greatest dimensions of tube	
diagonal	318,3 mm
width	277,8 mm
height	219 mm
Minimum useful screen dimensions (projected)	
diagonal	295,3 mm
horizontal axis	257,2 mm
vertical axis	195,2 mm
area	501 cm²
Implosion protection	T-band or safety panel
Bulb	J99A1
Bulb contact designation	IEC 67-III-2; JEDEC J1-21
Base designation	JEDEC B7-208
Basing	8HR
Mass, without safety panel	approx. 2,8 kg

RATINGS (Absolute Maximum System); cathode drive

Unless otherwise specified voltage values are positive and measured with respect to grid 1.

Anode voltage	max.	19 kV
	min.	12 kV
Grid 4 (focusing electrode) voltage		−500 to + 1000 V
Grid 2 voltage		
M31-300	max.	200 V*
	min.	80 V
M31-310	max.	700 V*
	min.	350 V
Cathode voltage to grid 1		
negative bias value	max.	0 V
negative peak value	max.	2 V
positive bias value		
M31-300	max.	200 V
M31-310	max.	150 V
positive peak value	max.	400 V
Heater voltage		
M31-300, M31-310	max.	7,3 V**
	min.	5,3 V**
Cathode-to-heater voltage		
M31-300	max.	200 V
M31-310	max.	250 V

* Improved picture sharpness is obtainable with increased grid 2 voltage (higher resolution).
** For maximum cathode life it is recommended that the heater supply be regulated at 6,3 V.

PHILIPS

TYPICAL OPERATING CONDITIONS; cathode drive

Voltages are specified with respect to grid 1

Anode voltage	17 kV	
Grid 4 (focusing electrode) voltage		
M31-300	0 to 130 V	note 1
M31-310	0 to 400 V	note 2
Grid 2 voltage		
M31-300	130 V	note 3
M31-310	400 V	note 3
Cathode voltage		
M31-300	42 to 62 V	note 4
M31-310	36 to 66 V	note 4

MAXIMUM CIRCUIT VALUES

Grid 1 circuit resistance	max. 1,5 MΩ

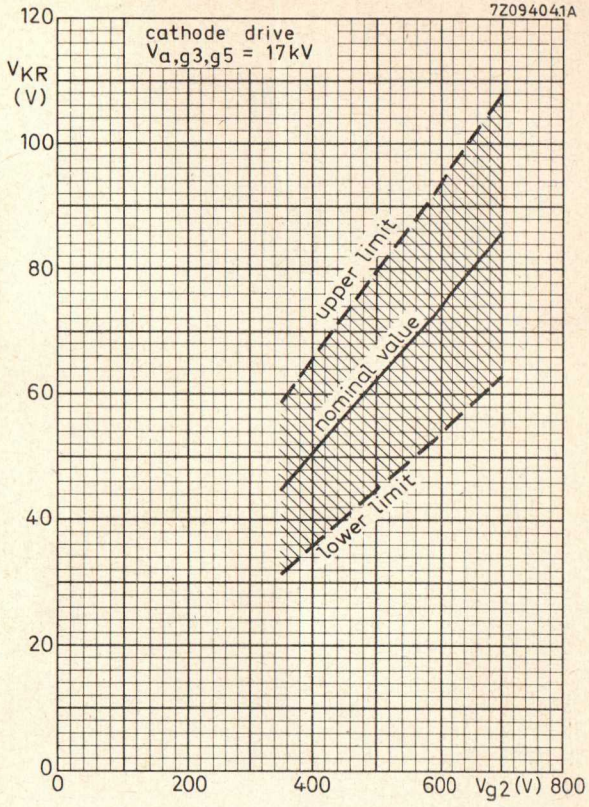
X-RADIATION CHARACTERISTIC

X-radiation emitted will not exceed 0,5 mR/h throughout the useful life of the tube, when operated within the given ratings. See curves on the opposite page.

Notes

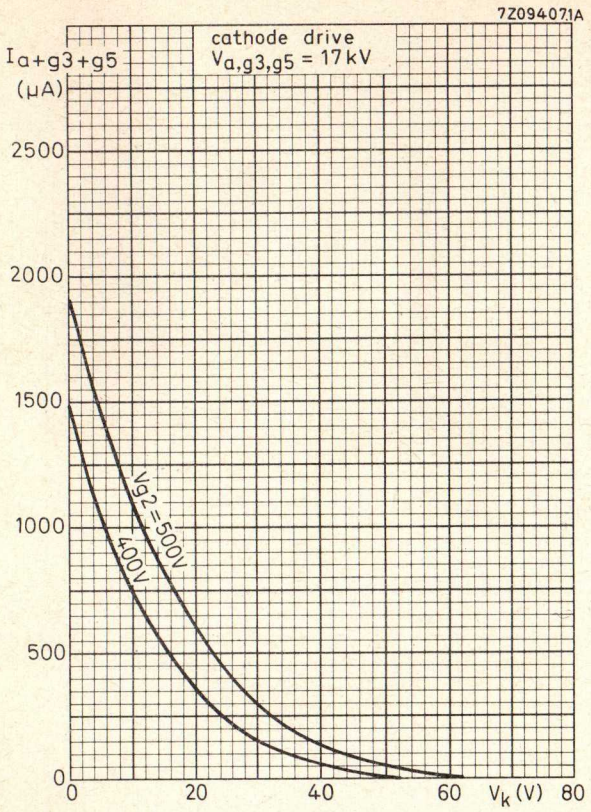
1. Because of the flat focus characteristic it is sufficient to choose a focusing voltage between 0 and 130 V (e.g. two taps, 0 V and 130 V). The optimum focus voltage of individual tubes may be between −100 and + 200 V.
2. Individual tubes will have optimum focus voltage within this range. In general an acceptable picture will be obtained with a fixed focus voltage.
3. Improved picture sharpness is obtainable with increased grid 2 voltage (higher resolution).
4. Visual extinction of focused raster.

DEVELOPMENT SAMPLE DATA



Limits of cathode cut-off voltage as a function of grid 2 voltage for monitor tubes of M31-310 series.

$$\frac{\Delta V_{KR}}{\Delta V_{a,\,g3,\,g5}} = 0{,}15 \times 10^{-3}$$

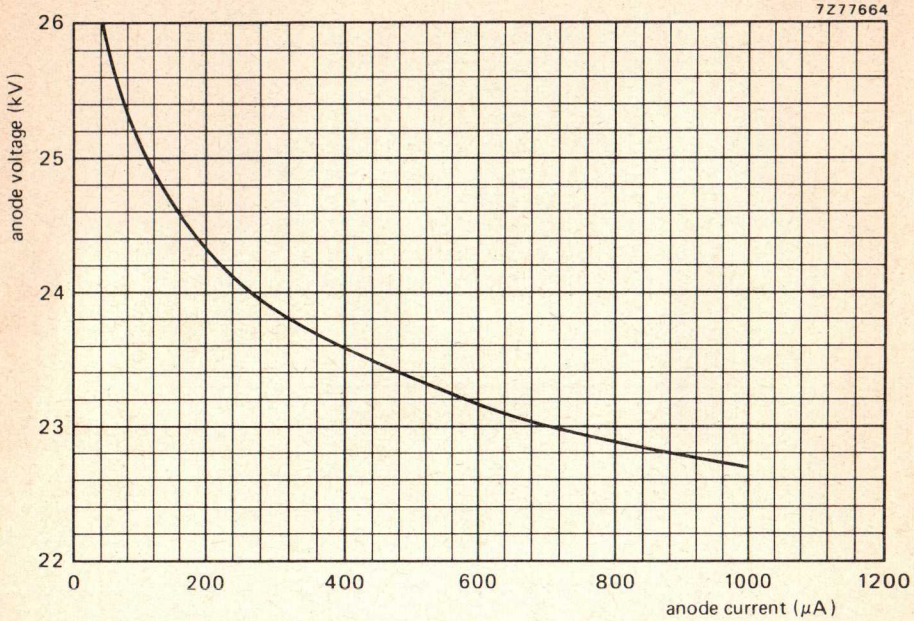


Final accelerator current as a function of cathode voltage for monitor tubes of M31-310 series.

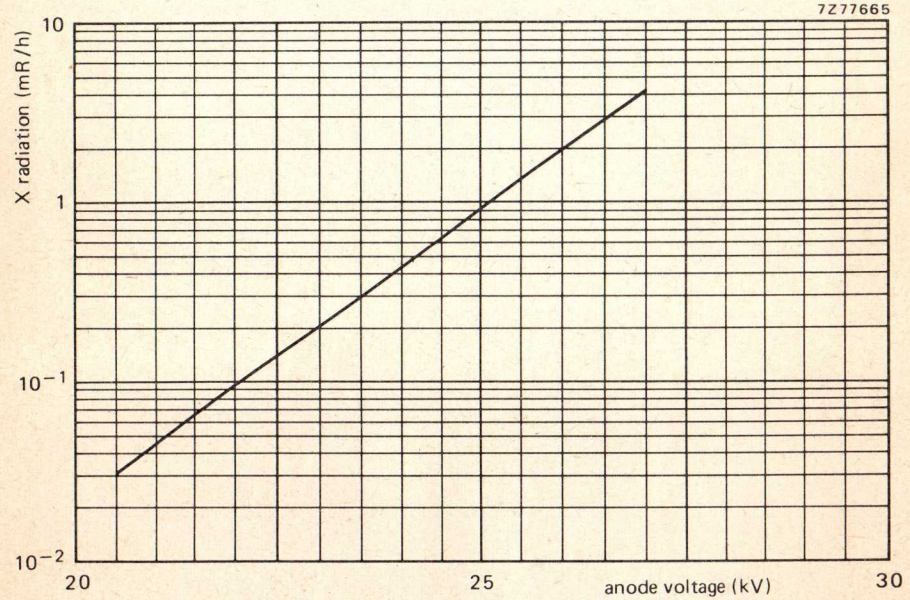
PHILIPS

M31-300 SERIES
M31-310 SERIES

DEVELOPMENT SAMPLE DATA

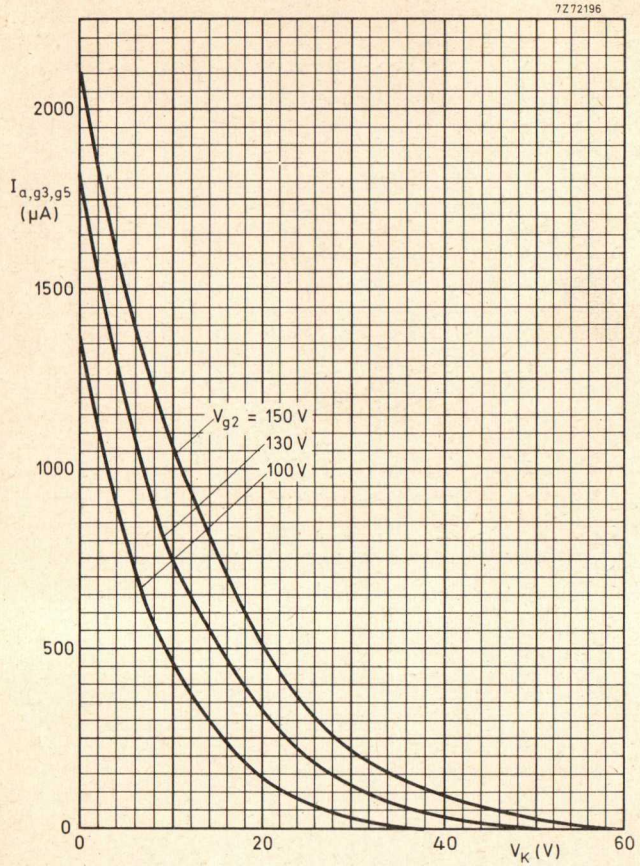


0,5 mR/h isodose-rate limit curve, according to JEDEC 65D.



X-radiation limit curve according to JEDEC 64D, at a constant anode current (Ia) of 250 μA.

PHILIPS

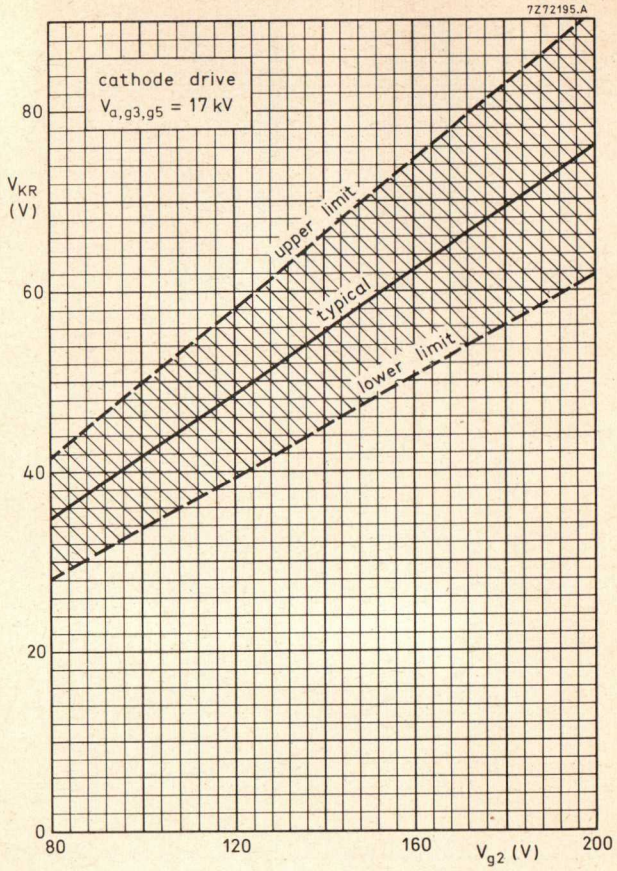


Final accelerator current as a function of cathode coltage for monitor tubes of M31-300 series.
Cathode drive; V_a, g3, g5 = 17 kV.

PHILIPS

M31-300 SERIES
M31-310 SERIES

DEVELOPMENT SAMPLE DATA



Limits of cathode cut-off voltage as a function of grid 2 voltage for monitor tubes of M31-300 series.

$$\frac{\Delta V_{KR}}{\Delta V_{a,\,g3,\,g5}} = 0{,}75 \times 10^{-3}$$

PHILIPS