

NATIONAL

XQ1290

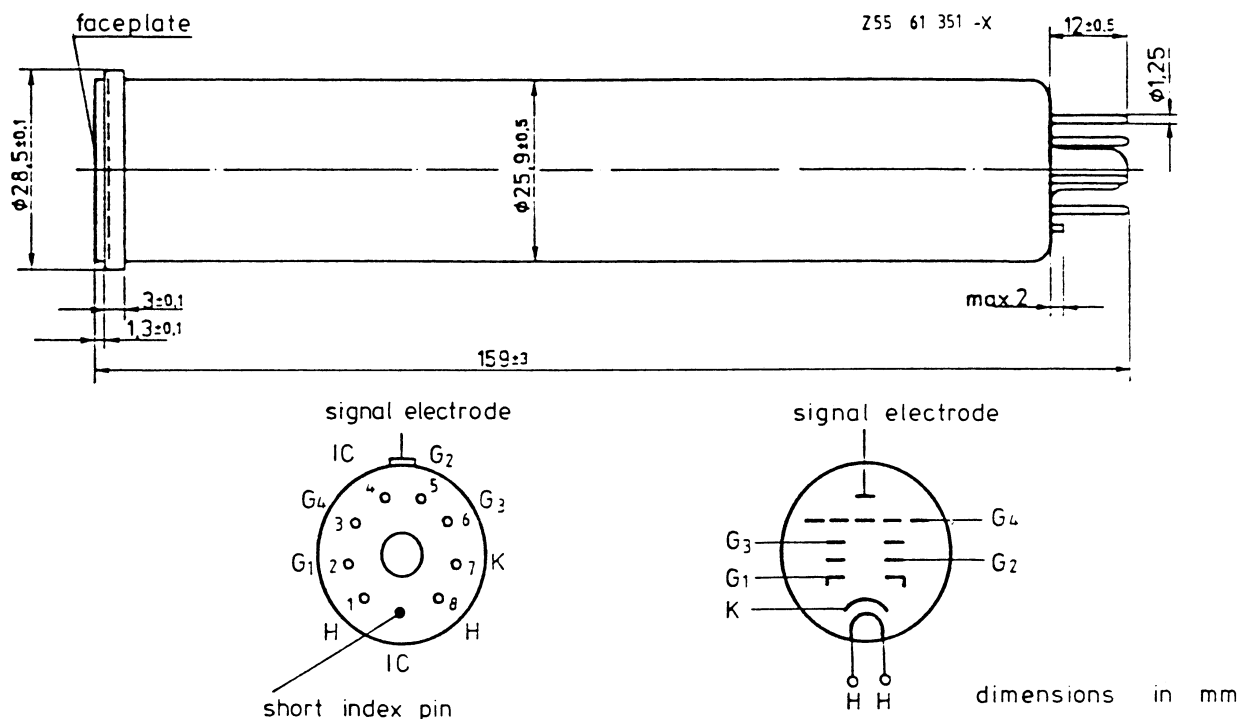
1" Camera Tube

Antimonytrisulfide - semiconducting photolayer ( $\text{Sb}_2\text{S}_3$ )

Separate mesh connection (grid-4-electrode)

High sensitivity - good resolution - wide dynamic range

**XQ 1290** for medical TV applications, especially in  
conjunction with an X-ray image intensifier



Max. length:	162 mm
Max. diameter:	28.6 mm
Weight:	approx. 60 g
Base:	8 pin special type
Socket:	1030 (for printed circuits) 1031 (with solder tags)
Focusing and deflection assembly:	BV 200, KV 9
Mounting position:	any

## Typical Operating Data and Characteristics

Heater voltage	6.3	V (1)
Heater current	95	mA (1)
	indirect by AC or DC, series or parallel supply (see operating instructions point 2.5)	
Grid No. 1 voltage		
Grid No. 1 cutoff voltage	-50 ... -100	V
Grid No. 2 voltage	300	V
Grid No. 3 voltage		
normal resolution	260 ... 300	V (2)
high resolution	560 ... 645	V (2)
Grid No. 4 voltage		
normal resolution	400	V (2)
high resolution	860	V (2)
Blanking voltage applied to Grid No. 1	75	V <sub>p-p</sub>
Blanking voltage applied to cathode	25	V <sub>p-p</sub>
Focusing method	magnetic	
Deflection method	magnetic	
Inter-electrode capacitance		
signal electrode to all other electrodes	3 - 5	pF (3)
Scanned area with a 3:4 aspect ratio	15.0 x 20.0	mm <sup>2</sup>
Useful diameter of the photoconductive layer	approx. 17	mm
Signal electrode voltage	20 ... 50	V (4)
Spectral response	see diagram	
Gamma value	~ 0.7	
Resolution at center of picture (Grid 3=620 V, Grid 4=860 V)	> 50	lp/mm (5)

## Typical Values

## XQ 1290

Faceplate temperature	$30 \pm 2$	°C
Scanned area	15.0 x 20.0	mm <sup>2</sup>
Dark current	30	nA <sub>p</sub>
Illumination	1.7	lx (6)
Signal output current	210	nA <sub>p</sub> (7)
	(≥170)	nA <sub>p</sub> (7)
Signal output deviation	± 15	% (8)
Modulation depth at 20 lp/mm	≥ 65	% (9)
Decay lag after 60 ms (3. field)	≤ 45	% (10)
after 400 ms (20. field)	≤ 10	% (10)

## Maximum Ratings (absolute values)

Full size scanning of the 15.0 mm x 20.0 mm area of the photoconductive layer must be assured.

Grid No. 1 voltage positive	max. 0	V
Grid No. 1 voltage negative	max. -150	V
Grid No. 2 voltage	max. 450	V
Grid No. 2 loading	max. 0.8	VA
Grid No. 3 voltage	max. 900	V
Grid No. 4 voltage	max. 1000	V
Peak heater-cathode voltage		
heater negative with respect to cathode	max. 125	V
heater positive with respect to cathode	max. 10	V
Faceplate temperature	max. 70	°C

## Notes

- (1) If the maximum variation of the heater voltage exceeds the absolute limit of  $\pm 5 \%$  the operating performance of the tube will be impaired and its life shortened. If series connection is applied the heater voltage may not exceed 9.5 V; it is recommended to use a current limiter. The preheating time of the tube should be 1 minute minimum with beam current off.
- (2) Optimum focusing of the electron beam is obtained by adjusting either the focusing coil current or varying grid no. 3 voltage. Grid no. 3 voltage must be more than 260 V and between 65 and 75 % of the voltage applied to grid no. 4. Optimum resolution is obtained by highest grid no. 4 voltage. Higher grid no. 4 voltage requires an increase of deflection current. If grid no. 3 voltage is increased a higher focusing current would be necessary. The optimum ratio of grid no. 4 to grid no. 3 voltage depends on the type of focusing and deflection coils. An improper voltage ratio may produce brightening or darkening in the faceplate corners. Generally, grid no. 4 voltage must be higher than grid no. 3 voltage.
- (3) This capacitance which is the effective output impedance of the tube (resistive component approx. 100 M $\Omega$ ) increases if the tube is mounted in the focusing and deflection coil assembly.
- (4) The signal electrode voltage must be adjusted to the value indicated in the test protocol. This value applies to a faceplate temperature of  $30 \pm 2$  °C. To obtain an optimum life time the dark current should not exceed the value of 30 nA<sub>p</sub>.
- (5) Measured with video amplifier of suitable bandwidth.
- (6) Corresponding to fluorescent screen P 20 (white light 2856 K and filter combination VG 9/1 mm, BG 18/2 mm).

- (7) The signal current is the peak target output current, measured in center of picture (minus dark current).
- (8) Deviation of the signal output current depends on the beam focusing and deflection linearity. The black to white transition in the middle of the test pattern is set as 100 % value. The maximum signal deviations within a radius of 6.4 mm are measured.
- (9) The modulation depth is measured at the faceplate center at 20 lp/mm in comparison with 1.3 lp/mm. The modulation depth depends on the signal output current. The signal output current amounts to  $250 \text{ nA}_p$ , the beam current is adjusted for stabilising a signal of  $500 \text{ nA}_p$ .
- (10) The decay lag is measured in percent of the signal output current, which is preset at  $250 \text{ nA}_p$ . The beam current is adjusted for stabilising a signal of  $500 \text{ nA}_p$ .

## Blemish Specification

### Test Conditions

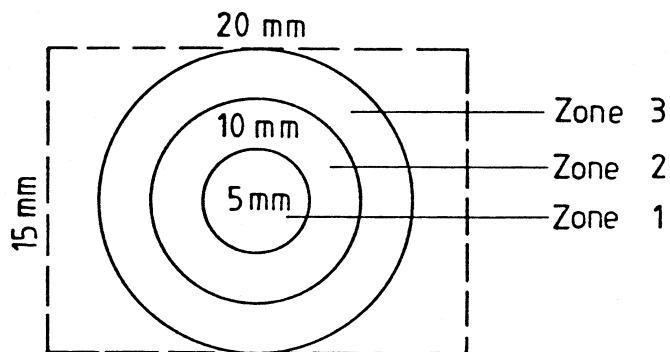
The tube shall be centred and focused according to the operating and adjusting instructions for optimum performance.

Illumination should be adjusted to a signal current of  $250 \text{ nA}_p$  at a beam current for stabilising a signal of  $500 \text{ nA}_p$ .

### Target Zones

An uniformly illuminated field with an aspect ratio of 3:4 and a scanned area of  $15.0 \text{ mm} \times 20.0 \text{ mm}$  shall be displayed on the target of the camera tube.

According to the following drawing the scanned area is divided into three zones I and II and III.



### **Blemish Specification**

The blemish size is measured in percent of the picture height. The equivalent numbers of TV-lines are indicated for comparison purposes only.

Black and white spots are equally weighted.

Measurement of blemishes will be performed with and without target illumination.

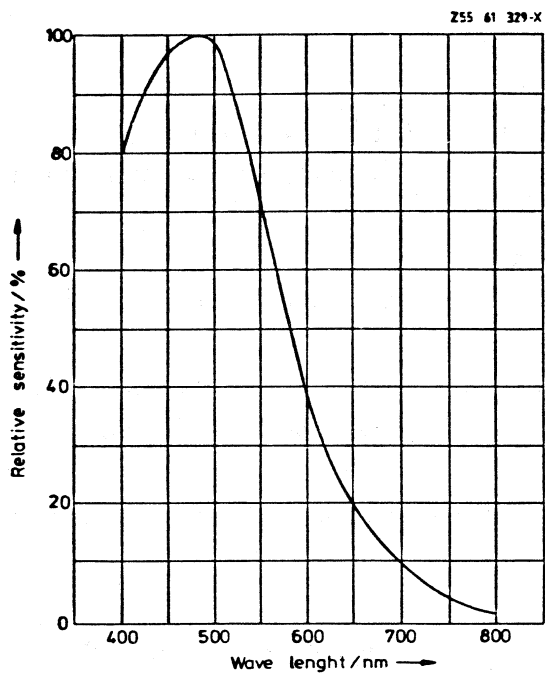
The minimum separation between two target spots must be greater than the diameter of the larger one, otherwise the combination is considered as a whole.

Target spots with a diameter  $\leq 0.2$  % of the picture height as well as blemishes with a modulation depth  $\leq 10$  % are not counted, unless an accumulation causes a smudged appearance.

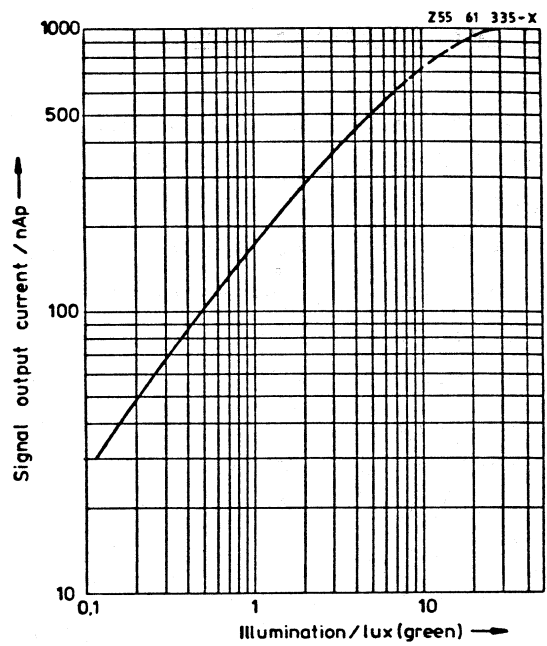
Blurred spots, streaks, stripes, mesh defects and mottled or grainy background are only permitted up to a noise amplitude of 10 %.

### **Possible Number, Size and Location of Blemishes**

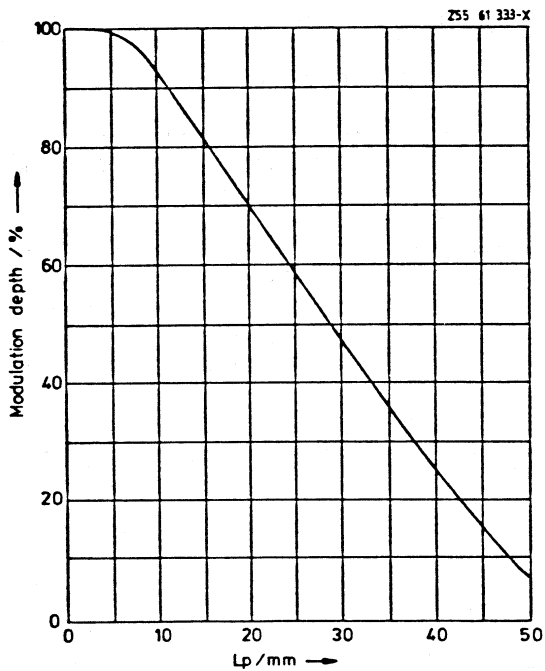
Blemish-size in % of picture height 15.0mm=100%	Blemish-size in TV-lines 625-line- system	Maximum permissible number of blemishes		
		Zone I	Zone II	Zone III
> 0.7	> 4	0	0	0
> 0.5... $\leq$ 0.7	> 3...4	0	0	1
> 0.2... $\leq$ 0.5	> 1...3	0	2	4
Max. permissible total number of blemishes		4		



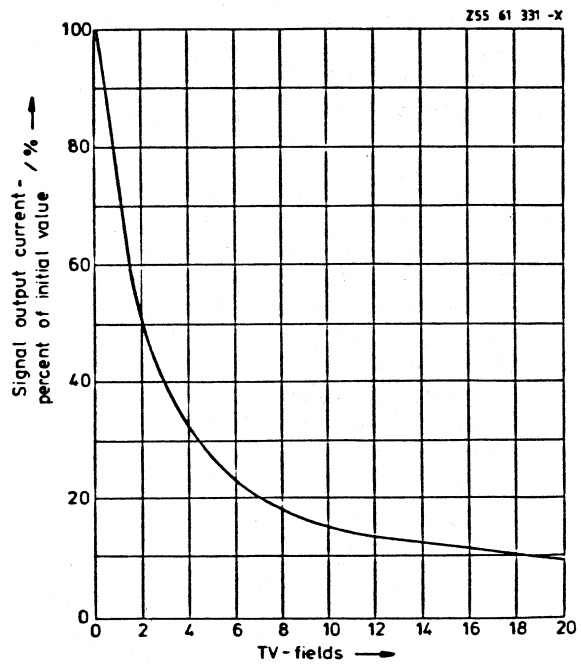
Spectral sensitivity



Signal output current as a function of illumination



Typical modulation depth (square wave response)



Typical lag characteristic (Decay lag)