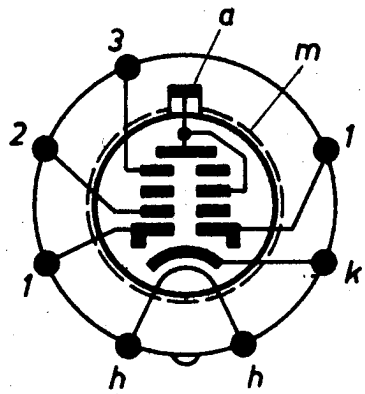
ITT	28 cm-Rectangular TV Picture Tube, 90° deflection angle, aluminized screen, with tensionband for battery-operated television-sets	A28-13W - Preliminary -



Electron gun		Tetrode with Einzel-lens
Bulb		All-glass
Base		Special miniature (7 pins)
Focusing		Electrostatic
Deflection		Magnetic
Angle of deflection	Diagonal	90°
	Horizontal	80°
	Vertical	63°
Neck diameter		20 mm
Face	Shape	Spherical
	Material	Filter-glass (Light-transmittance 62 % appr.)
Phosphor		P 4-Aluminized
Fluorescence colour		White
Colour temperature		7500° K appr.
Minimum useful dimensions		228 x 171 mm
		Diagonal 262,5 mm
Overall length incl. base		Max 245 ± 5 mm
Weight		2,0 kg appr.

1. Heater Characteristics for Parallel Connection

Heater voltage	11[1]	volts
Heater current	68 appr.	ma

Oxide cathode, indirectly heated

2. Typical Operating Conditions (Cathode drive service)[2]

Anode voltage	11 000		volts
Screen grid voltage	200 to 350	250	volts
Focusing voltage[4]	0 to 350		volts
Cut-off voltage	45 appr.[3]	32 to 58	volts

The external conductive coating of the tube shall be grounded.

The tube can be used without safety glass.

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1) At mains-connection ± 15 %.
At stabilized operation or when heating from the scanning-line-transformer ± 10 %.
At battery operation look at the diagram on page 6.

2) Unless otherwise specified, all voltages are positive with respect to grid No. 1.

3) The cut-off voltage is defined by tact voltage, below which disappears the raster adjusted to give a sharp image.

4) The voltage to be set depends on the deflection system utilized and the operating conditions.

3. Ratings

Anode voltage (I_k = 0)	12 000	volts
Minimum anode voltage	7 500 [1]	volts
Maximum grid No. 3 voltage	450	volts
Maximum negative grid No. 3 voltage	-100	volts
Maximum screen grid voltage	450	volts
Minimum screen grid voltage	180	volts
Maximum cathode voltage	100	volts
Minimum cathode voltage	0	volt
Maximum cathode peak voltage	350 [2]	volts
Minimum negative cathode peak voltage	-2	volts
Specif. screen dissipation per sqcm	10	mw/cm^2
Grid leak resistance DC	1.5	megohms
Grid leak resistance AC (50 C/s)	0.5	megohm
External resistance between heater and cathode DC	1.0 [3]	megohm
External resistance between heater and cathode AC (50 C/s)	0.1 [4]	megohm
Maximum heater - cathode voltage	80 [5]	volts
Maximum heater - cathode peak voltage	130	volts

The power cource generating the operating voltage shall be designed so, that the permanent current resulting from a short-circuit is less than 5 ma.

4. Capacitances

Control grid - all other electrodes	appr. 6	pF
Cathode - all other electrodes	appr. 3	pF
Anode - external conductive coating	700	pF
Anode - tensionband	125	pF

5. Particular Indications

a) The maximum grid No. 3 current may be 24 µa.

b) The high field intensity present in the tube neck may lead to fluorescence on the glass; however, no conclusions can be drawn from this as to vacuum and life of tube.

c) Excluding extraneous fields, the center of the undeflected focused spot will fall within a circle having 9.0 mm radius concentric with the center of the tube face.

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Notes for page 2

1) The anode voltage should not be below minimum rating. The picture sharpness decreases with decreasing anode voltage, and with an anode voltage below 7500 volts dark screen areas might appear due to the aluminization, as the velocity of the electrons will not be sufficiently high to penetrate the aluminium coating.

2) Line change impulse max 22 % of line sweep period.
Frame change impulse max 1.5 ms.

3) With separate transformer.

4) With series connection.
When feeded by separate transformer, this external resistance may be 1 MΩ.

5) To avoid picture distortions, the interference proceeding from the heater must be kept as low as possible. Therefore, the AC-voltage between heater and cathode shall by no means exceed the value V_{hkrms} = 20 volts.

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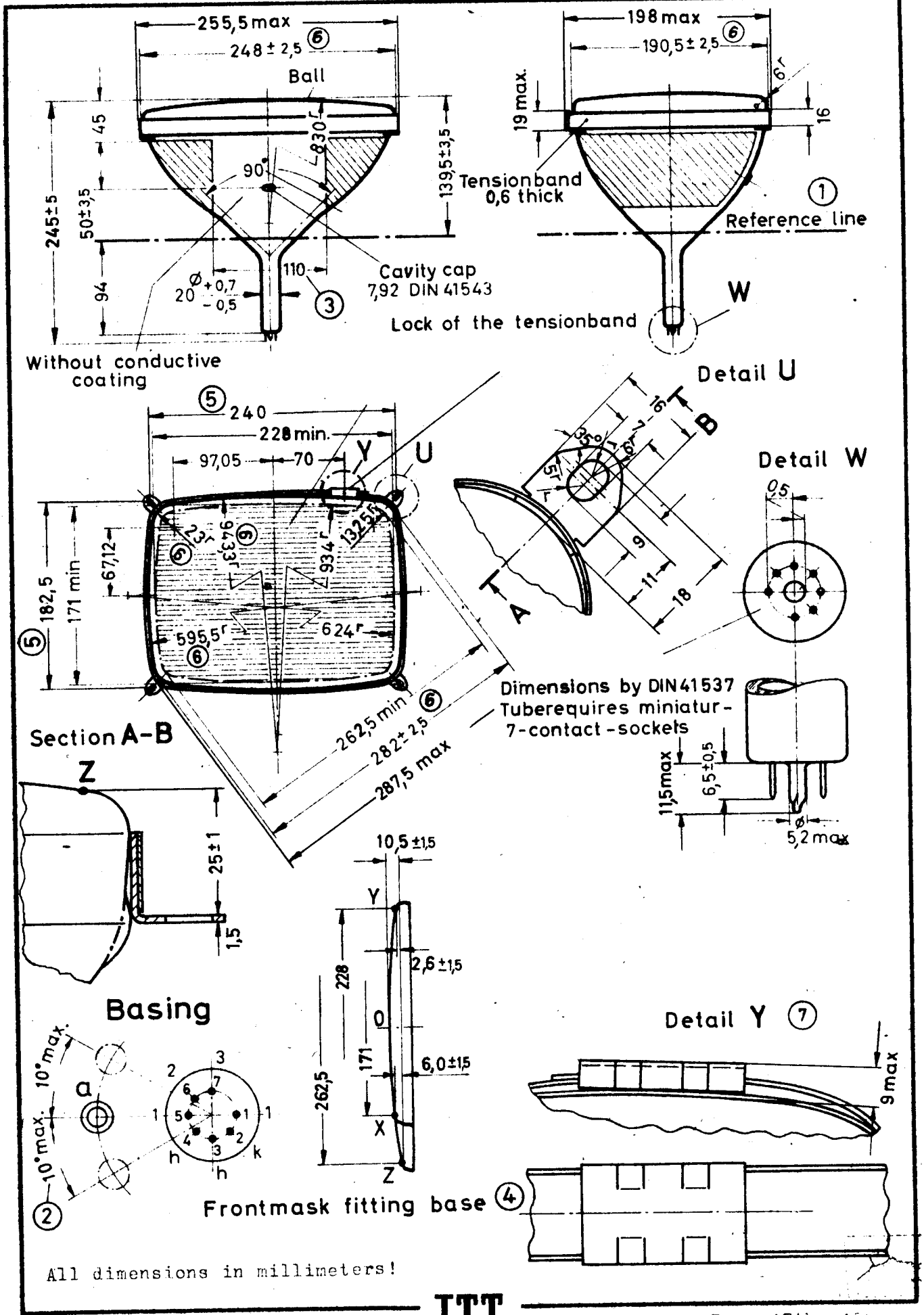
Notes for page 4 and 7

1) The reference line is defined by the marked plane of the reference line gauge if the letter rests against the cone of the bulb. The gauge must not be supported on the front.
2) Angular deviations between the anode cavity cap and the base pins No. 1 and 5.
3) This area is to be cleaned only with soft dry lintless cloth.
4) The point "Z" is a reference point to the position of the points "X" and "Y".
   The dimensions for the points "X", "Y" and "Z" are identically to the minimum useful screen dimensions.
5) For the mounting bolts, a free passage of at least 5,7 mm diameter at nominal position is ensured.
6) The indicated dimensions rely on the bulb.
7) This stud is provided for putting-on a clip (e.g. type Faston).

A28-13W

- Preliminary -



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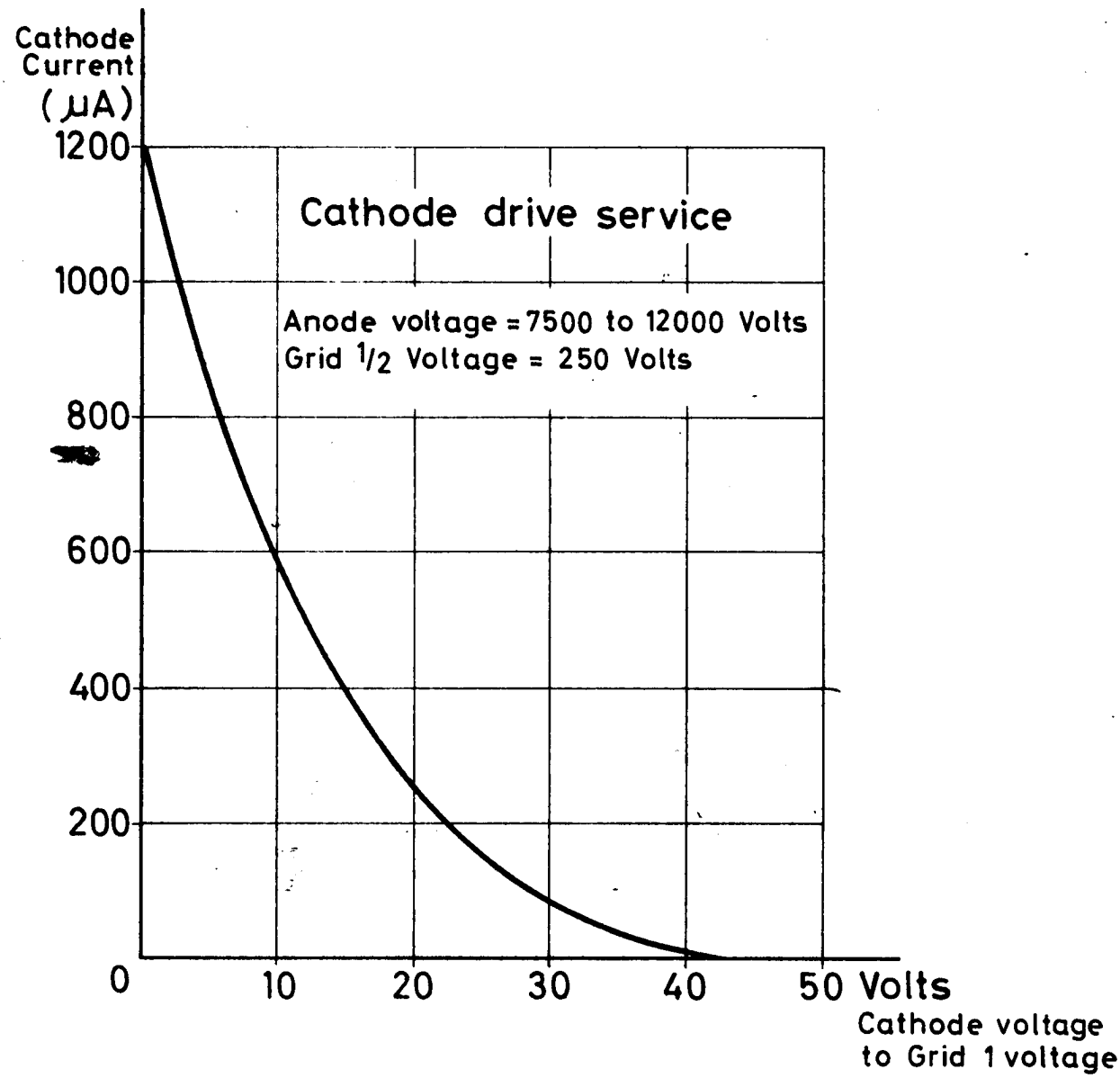
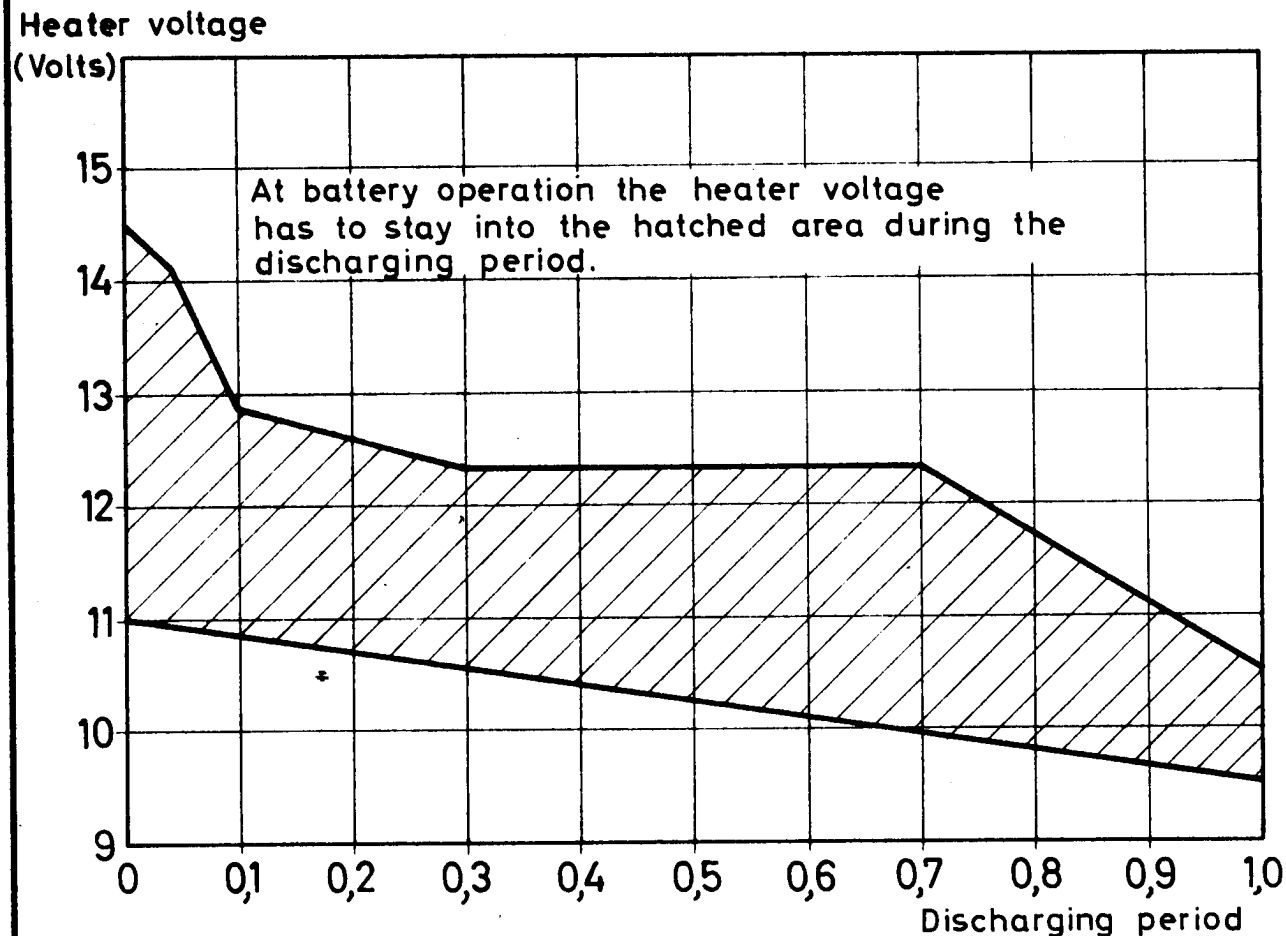
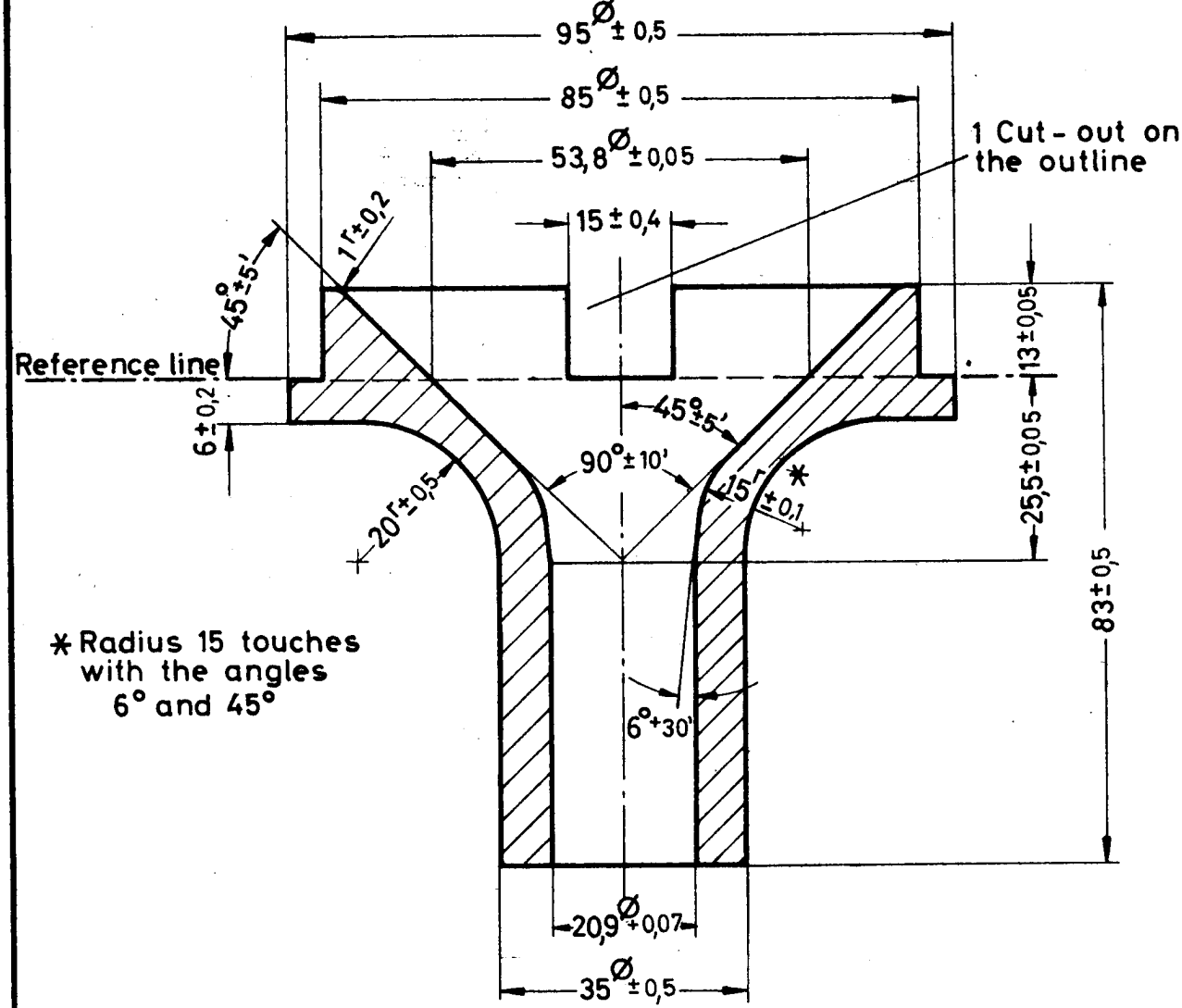

Cathode Current (µA)
1200
1000
800
600
400
200
0
Cathode drive service
Anode voltage = 7500 to 12000 Volts
Grid 1/2 Voltage = 250 Volts
10
20
30
40
50 Volts
Cathode voltage to Grid 1 voltage


Heater voltage
(Volts)
15
14
13
12
11
10
9
At battery operation the heater voltage has to stay into the hatched area during the discharging period.
0
0,1
0,2
0,3
0,4
0,5
0,6
0,7
0,8
0,9
1,0
Discharging period

Reference line gauge

for Picture tubes with 90° deflection angle and 20 mm neck diameter



* Radius 15 touches with the angles 6° and 45°

All dimensions in millimeters!