

CATHODE-RAY TUBE

The TELEFUNKEN Type 3 BNP 1 is a three inch, flat face, single beam, electrostatic deflection and focus Cathode-Ray Tube, with high light output, high deflection sensitivity and small spot size. Specially shaped deflecting plates allow deflection with symmetrical as well as asymmetrical voltages for D1, D2 and D3, D4.

Focusing Method electrostatic
Deflecting Method electrostatic

Direct Interelectrode Capacitances, Approximate

Cathode to all other electrodes	7.7	$\mu\mu\text{f}$
Grid 1 to all other electrodes	9.0	$\mu\mu\text{f}$
D1 to D2	2.4	$\mu\mu\text{f}$
D3 to D4	1.7	$\mu\mu\text{f}$
D1 to all other electrodes except D2	5.7	$\mu\mu\text{f}$
D2 to all other electrodes except D1	5.7	$\mu\mu\text{f}$
D3 to all other electrodes except D4	3.8	$\mu\mu\text{f}$
D4 to all other electrodes except D3	4.6	$\mu\mu\text{f}$

OPTICAL DATA

Phosphor Number	P 1
Fluorescent Color	Green
Phosphorescent Color	—
Persistence	Medium

MECHANICAL DATA

Overall Length	$6\frac{57}{64} \pm 0.2$	Inches
Greatest Diameter of Bulb	$3 \pm \frac{1}{16}$	Inches
Minimum Useful Screen Diameter	$2\frac{43}{64}$	Inches
Base (Medium-Shell Diheptal 12 pin)		B 12-37
Base Alignment		
D1 D2 trace aligns with pin No. 9 and tube axis	45 ± 10	Degrees
Positive voltage on D1 deflects beam approximately toward pin No. 14		
Positive voltage on D3 deflects beam approximately toward pin No. 4		
Angle between D3 D4 and D1 D2 traces	90 ± 1.5	Degrees



RATINGS (design Center Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 volts	0.3 ± 10 %	Ampere
Anode Voltage	1,000	Max Volts DC
Cathode Current	200	Max Microamp. eff
Grid 3 (Focusing Electrode) Voltage	500	Max Volts DC
Grid 1 Voltage		
Negative-Bias Value	-250	Max Volts DC
Positive-Bias Value	0	Max Volts DC
Positive-Peak Value	0	Max Volts
Peak-Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	125	Max Volts
After equipment warm-up period	125	Max Volts
Heater positive with respect to cathode	125	Max Volts
Peak Voltage between Anode and any Deflection Electrode	500	Max Volts

TYPICAL OPERATING CONDITIONS

Anode Voltage	800	Volts
Grid 3 Voltage (Focusing Electrode)	30 to 115	Volts
Grid 1 Voltage (Note 1)	-85 to -45	Volts
Deflection Factors:		
D1 and D2	104 to 117	Volts DC per inch
D3 and D4	49.5 to 59.7	Volts DC per inch
Focusing Electrode Current		
for any operating condition	-20 to +20	Microamperes
Spot Position (undeflected) (Note 3)	3	Max Millimeters
Line Width (Note 4)	0.024	Max Inches
Deflection factor uniformity (Note 5)	2	% max.
Pattern distortion (Note 6)	2	% max.

For Anode Voltage not shown in the preceding table,
the following can be used as a guide:

Focusing Electrode Voltage	3.75 % to 14.4 %	of Anode Volts
Grid 1 Voltage (Note 1)	-10.6 % to -5.6 %	of Anode Volts



Deflection Factors:

D1 and D2	130 to 146	Volts DC per inch per Kilovolt of Anode
D3 and D4	62 to 74,5	Volts DC per inch per Kilovolt of Anode
Useful screen D1-D2	65	Min Millimeters
Useful screen D3-D4	60	Min Millimeters

MAXIMUM CIRCUIT VALUES

Grid 1 Circuit Resistance	10	Max Megohms
Resistance in any Deflecting-Electrode Circuit (Note 2)	3	Max Megohms

Pin Connection

Pin No. 1	Heater
Pin No. 2	Cathode
Pin No. 3	Grid No. 1
Pin No. 4	Internal Connection
Pin No. 5	Focusing Electrode
Pin No. 7	Deflecting Electrode D3
Pin No. 8	Deflecting Electrode D4
Pin No. 9	Accelerator
Pin No. 10	Deflecting Electrode D1
Pin No. 11	Deflecting Electrode D2
Pin No. 12	Internal Connection
Pin No. 14	Heater

CATHODE-RAY TUBE CHARACTERISTICS NOTES

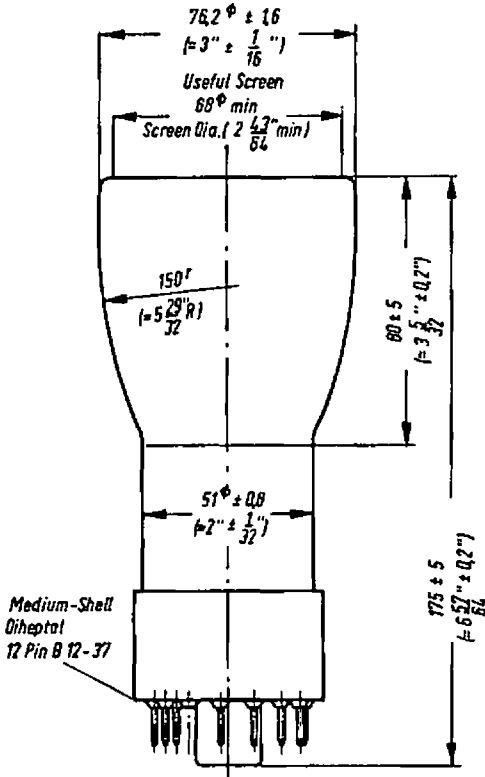
1. Visual extinction of undeflected focused spot.
2. It is recommended that the deflecting-electrode-circuit resistance be approximately equal.
3. Connect free deflecting electrodes to anode.
4. For a beam current of 25 microamperes DC in accordance with Mil-E-1C specification.
5. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for deflections of less than 75 % of the useful scan will not differ from the deflection factor for a deflection of 25 % of the useful scan by more than specified amount.
6. The edges of a raster pattern with the mean dimension 40×40 mm will not deviate from the mean dimension by more than the specified amount.



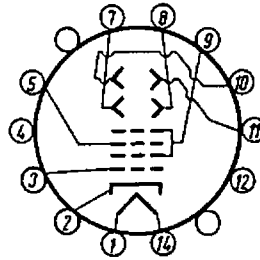
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Dimensional Outline



Socket Connection Bottom View

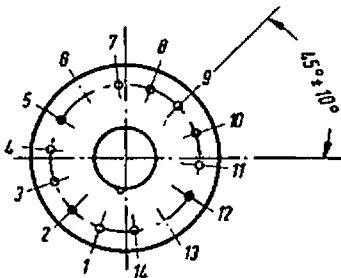


- Pin 1: Heater
- Pin 2: Cathode
- Pin 3: Grid No. 1
- Pin 4: Internal Connection
- Pin 5: Focusing Electrode

- Pin 7: Deflecting Electrode D3
- Pin 8: Deflecting Electrode D4
- Pin 9: Accelerator
- Pin 10: Deflecting Electrode D1
- Pin 11: Deflecting Electrode D2
- Pin 12: Internal Connection

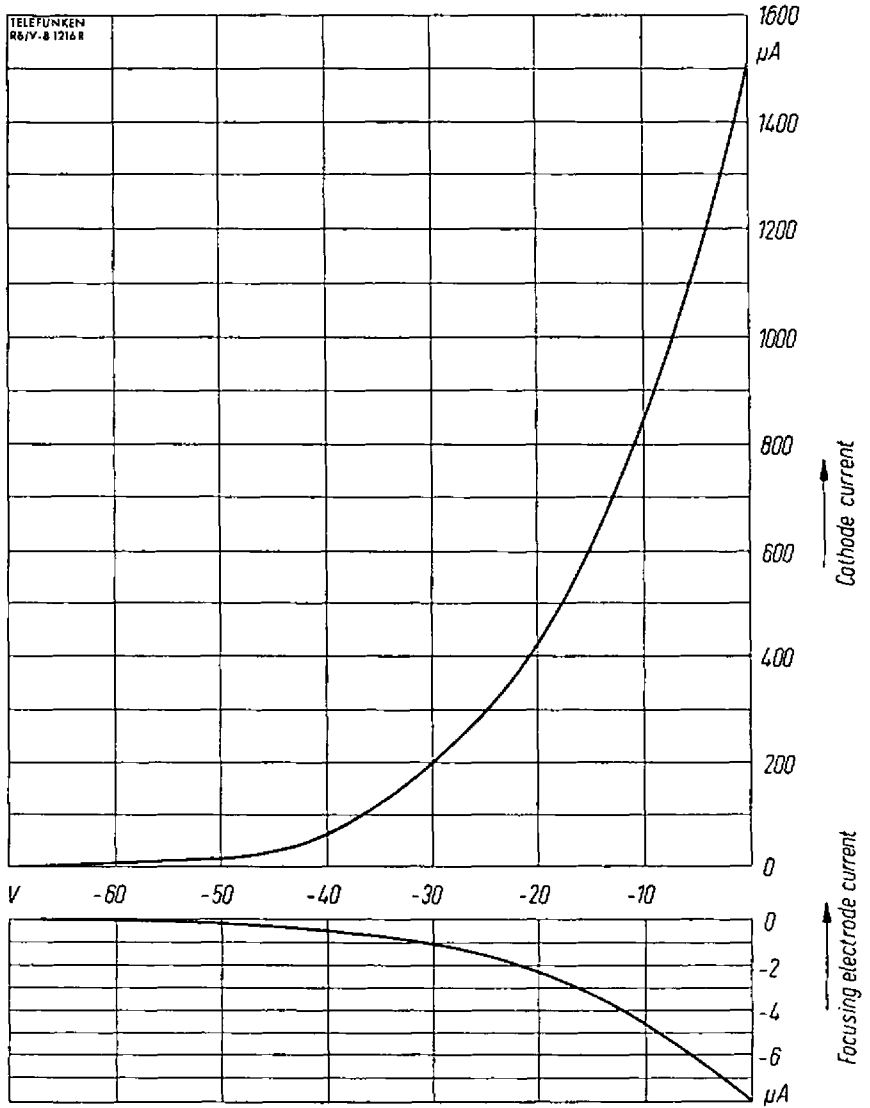
- Pin 14: Heater

View of underside of base



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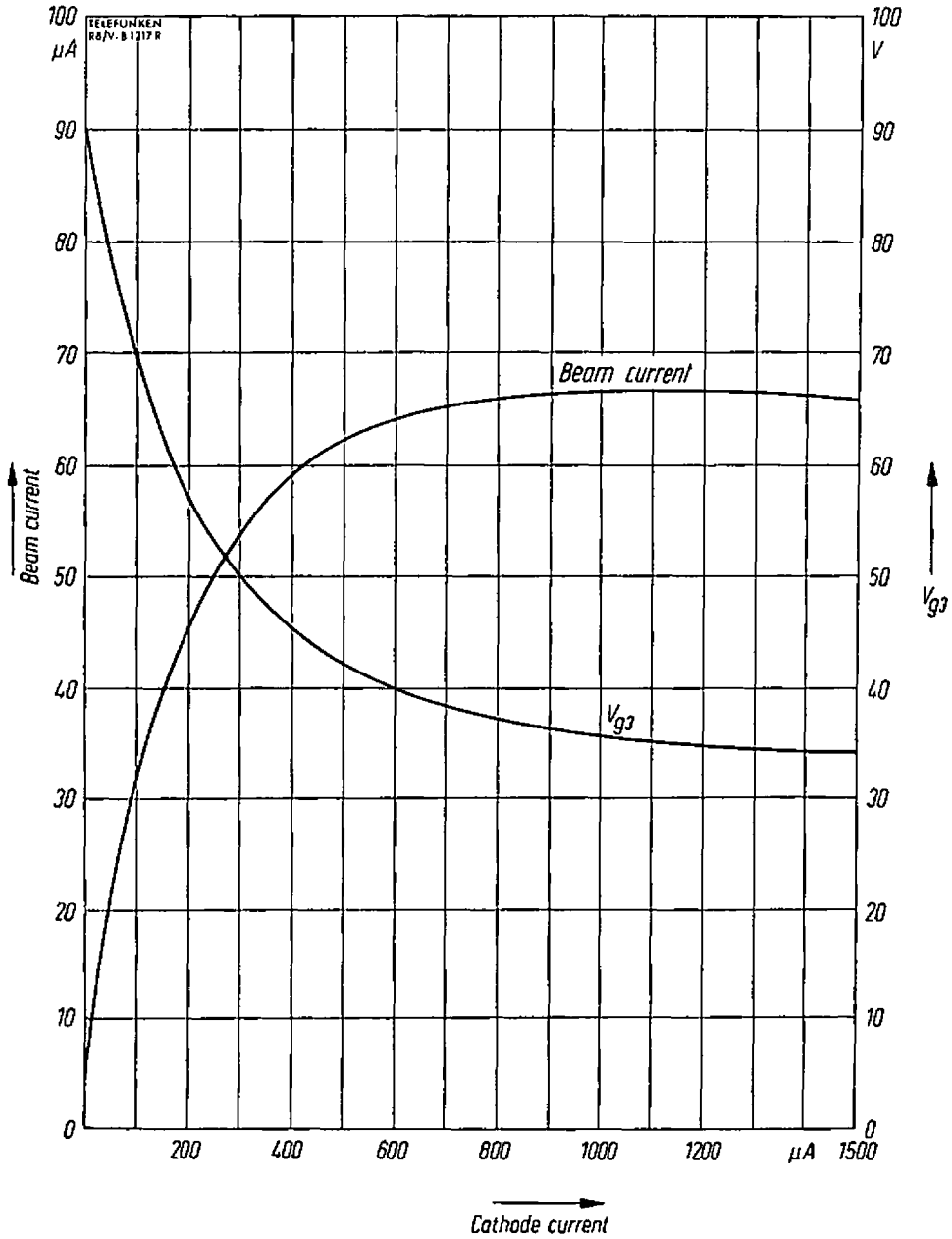
V_{g1} →

$V_a = 800$ V



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$V_a = 800 V$

