

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
CATHODERAY

17BZP4

Specialized - Cathode Ray electronic tube

Seventeen-inch aluminized direct-view television picture tube with electrostatic focusing, magnetic deflection, a unipotential cathode, and external ion-trap arrangement. Manufacturer data document high-voltage operation and optical screen characteristics.

GENERAL CHARACTERISTICS

BASE DESIGNATION	-	BASE PINS	7
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	- / -
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray
No fixed ratings recorded.
Published ratings/characteristics promoted where applicable; additional operating data retained in TUBE_SECTION_PARAMETER.

17BZP4 — Electrostatic-Focus Magnetic-Deflection Television Picture Tube

The **17BZP4** is a very short, direct-view rectangular glass picture tube designed for television receiver applications. It features a low-voltage electrostatic focusing system, a straight electron gun that does not require an ion trap magnet, and a wide-angle magnetic deflection system. The tube incorporates an aluminized screen with a gray filter faceplate to enhance picture contrast and brightness, along with an external conductive coating that serves as a supplementary filter capacitor when grounded.

Physical and Mechanical Construction

The 17BZP4 is constructed with a rectangular glass bulb (bulb number J132-1/2 A1 or equivalent) and a spherical faceplate. The faceplate is made of gray filter glass with a light transmission of approximately 78% at the center. The screen utilizes a sulfide-type P-4 phosphor, which produces a white fluorescence and phosphorescence with a short persistence.

Dimensions and Weight

The physical dimensions of the tube are optimized for a compact cabinet design, featuring a very short overall length:

- **Overall Length:** $12\text{-}9/16 \pm 1/4$ inches
- **Neck Length:** $5\text{-}7/16 \pm 1/8$ inches
- **Neck Diameter:** 1.168 inches maximum at the splice
- **Greatest Bulb Dimensions:**
 - Diagonal: $16\text{-}9/16 \pm 1/8$ inches
 - Width: $15\text{-}5/8 \pm 1/8$ inches
 - Height: $12\text{-}3/4 \pm 1/8$ inches
- **Minimum Useful Screen Dimensions:**
 - Diagonal: 15-3/4 inches
 - Width: 14-3/4 inches
 - Height: 11-11/16 inches
 - Minimum Useful Area: 155 square inches
- **Net Weight:** Approximately 10 lbs

The tube can be mounted in any position. The electrical connection to the high-voltage anode is made via a recessed small cavity cap (JETEC No. J1-21) located on the bulb cone. This anode contact is aligned with pin position #4 within a tolerance of ± 30 degrees.

Electron Gun, Heater, and Basing Configuration

The 17BZP4 employs a straight electron gun design that eliminates the need for an external ion trap magnet. It uses a coated unipotential cathode with an indirectly heated element.

Heater Characteristics

The heater is designed for operation from either an AC or DC supply:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A
- **Heater Warm-up Time:** 11 seconds to reach 80% of the rated voltage under specified test conditions

Basing and Pin Connections

The tube uses a Small Button Eightar 7-Pin base (Style B, JETEC No. B7-183) with an 8HR basing arrangement. The pin connections, viewed from the bottom of the base, are as follows:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1 (Control Grid)
- **Pin 3:** Grid No. 2 (Screen Grid)
- **Pin 4:** Grid No. 4 (Focusing Electrode)
- **Pin 6:** Grid No. 1 (Control Grid, internally connected to Pin 2)
- **Pin 7:** Cathode
- **Pin 8:** Heater
- **Anode Cap:** Grid No. 3 and Grid No. 5 (Anode)

Electrical Characteristics and Interelectrode Capacitances

The 17BZP4 utilizes electrostatic focusing and magnetic deflection. The deflection angles are wide to allow for a short bulb profile:

- **Horizontal Deflection Angle:** 105°
- **Vertical Deflection Angle:** 87°
- **Diagonal Deflection Angle:** 110°

Direct Interelectrode Capacitances

The direct capacitances between the electrodes are approximately:

- **Cathode to all other electrodes:** 5 μF
- **Grid No. 1 to all other electrodes:** 6 μF
- **External conductive coating to anode:** 1500 μF maximum, and 800 to 1000 μF minimum

The external conductive coating must be properly grounded, as it forms a supplementary high-voltage filter capacitor in conjunction with the internal anode coating. The tube also features a transparent insulating coating of approximately 6 inches in diameter around the anode cap to prevent high-voltage arcing.

Operating Modes and Typical Characteristics

The 17BZP4 can be operated in either Grid Drive service or Cathode Drive service, depending on where the video signal is applied.

Grid Drive Service

In Grid Drive service, the video signal varies the Grid No. 1 potential with respect to the cathode. Typical operating conditions are:

- **Anode Voltage:** 14,000 V to 16,000 V
- **Grid No. 4 (Focus) Voltage:** 0 to 400 V
- **Grid No. 2 Voltage:** 300 V (at 14,000 V anode) or 400 V (at 16,000 V anode)
- **Grid No. 1 Raster Cutoff Voltage:** -28 to -72 V (at 14,000 V anode / 300 V Grid 2) or -36 to -94 V (at 16,000 V anode / 400 V Grid 2)

Cathode Drive Service

In Cathode Drive service, the video signal varies the cathode potential with respect to Grid No. 1 and the other electrodes. Typical operating conditions are:

- **Anode-to-Grid No. 1 Voltage:** 14,000 V to 16,000 V
- **Grid No. 4-to-Grid No. 1 Voltage:** 0 to 400 V
- **Grid No. 2-to-Grid No. 1 Voltage:** 300 V (at 14,000 V anode) or 400 V (at 16,000 V anode)
- **Cathode-to-Grid No. 1 Raster Cutoff Voltage:** 28 to 60 V (at 14,000 V anode / 300 V Grid 2) or 36 to 78 V (at 16,000 V anode / 400 V Grid 2)

In both modes, visual extinction of the focused raster is achieved within the specified cutoff voltage ranges.

Maximum Ratings and Circuit Constraints

The maximum ratings for the 17BZP4 are established under the Design Center System. Operating the tube outside these limits may cause permanent damage or degrade performance.

Design Center Maximum Ratings

- **Anode Voltage:** 16,000 V maximum
- **Grid No. 4 (Focus) Voltage:** -500 V to +1000 V maximum
- **Grid No. 2 Voltage:** 500 V maximum
- **Grid No. 1 Voltage:**
 - DC Negative-Bias Value: 140 V maximum
 - Negative Peak Value: 200 V maximum
 - DC Positive-Bias Value: 0 V maximum
 - Positive Peak Value: 2 V maximum
- **Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode: 180 V maximum
 - Heater positive with respect to cathode: 180 V maximum
- **Cathode Drive Specific Limits:**
 - Grid No. 2 to Grid No. 1 Voltage: 640 V maximum
 - Grid No. 2 to Cathode Voltage: 500 V maximum

Limiting Circuit Values

- **Grid No. 1 Circuit Resistance:** 1.5 MΩ maximum
- **Grid No. 2 Circuit Resistance:** 10,000 Ω minimum (a protective resistance is advisable)
- **Grid No. 4 Circuit Resistance:** 10,000 Ω minimum (a protective resistance is advisable)

Operating Considerations and Safety

- **Minimum Anode Voltage:** Operation of the 17BZP4 below 12,000 V is not recommended. Lower voltages lead to a significant degradation in picture brilliance and definition.
- **X-Ray Radiation Warning:** The tube is capable of operating at voltages up to an absolute maximum of 17.6 kV. If the operating voltage exceeds 16 kV, appropriate shielding may be required to protect users from X-ray exposure.

Technical Summary

The **17BZP4** is a compact, wide-angle (**110° diagonal deflection**) television picture tube featuring a **15-3/4" diagonal rectangular screen** and a short **12-9/16" overall length**. It utilizes **low-voltage electrostatic focusing** and **magnetic deflection**, operating without an external ion trap magnet. The tube is designed for a nominal **6.3 V, 0.6 A** heater supply and can be configured for either **Grid Drive** or **Cathode Drive** video input. With a maximum anode rating of **16,000 V** and an aluminized **P-4 phosphor screen**, it provides high-brightness monochrome displays for television receivers, provided that anode potentials are maintained above **12,000 V** to preserve image quality.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1961 TUNG SOL

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	Nominal
Heater current	600 mA	Nominal
Anode voltage	16 V	Published CRT operating condition
Grid 2 voltage	500 V	Published CRT operating condition



SOURCE OPERATING CONDITIONS

1965 Sylvania Electronic Tubes Vol3

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	1 code	LowVoltageElectrostatic
Deflection method	1 code	Magnetic
Deflection angle	110 deg	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode voltage maximum	16000 V	—
Anode voltage	14000 V	—
Grid No. 2 voltage maximum	500 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No. 4 focusing voltage minimum	0 V	—
Grid No. 4 focusing voltage maximum	400 V	—



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1966 Tung Sol Electronic Tubes 4 of 4

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

Section 1 · Cathode Ray

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
GRID ti TO ALL OTHER ELECTRODES	6 MMF	GRID ti TO ALL OTHER ELECTRODES 6 µmf

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER VOLTAGE G	3 V	HEATER VOLTAGE G.3 VOLTS
MAXIMUM DC ANODE VOLTAGE	16000 V	MAXIMUM DC ANODE VOLTAGE 16 000 VOLTS
MAXIMUM DC GRID i2 VOLTAGE	500 V	MAXIMUM DC GRID i2 VOLTAGE 500 VOLTS
HEATER NEGATIVE WITH RESPECT TO CATHODE LB	0 V	HEATER NEGATIVE WITH RESPECT TO CATHODE LBO VOLTS
HEATER POSITIVE WITH RESPECT TO CA TM 00E	180 V	HEATER POSITIVE WITH RESPECT TO CA TM 00E 180 VOLTS
MAXIMUM GRID ii CIRCUIT RESISTANCE	15 Mohm	MAXIMUM GRID ii CIRCUIT RESISTANCE 1,5 MEGOHMS
HEATER VOLTAGE	63 V	HEATER VOLTAGE 6,3 VOLTS
MAXIMUM DC ANODE VOLTAGE j	6000 V	MAXIMUM DC ANODE VOLTAGE j6 000 VOLTS
HEATER NEGATIVE WITH RESPECT TO CATHODE 1H	0 V	HEATER NEGATIVE WITH RESPECT TO CATHODE 1HO VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE LS	0 V	HEATER POSITIVE WITH RESPECT TO CATHODE LSO VOLTS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM GRID #2 TO CATHODE VOLTAGE	500 V	MAXIMUM GRID #2 TO CATHODE VOLTAGE 500 voLTs
MAXIMUM GRID #1 CIRCUIT RESISTANCE j,	5 Mohm	MAXIMUM GRID #1 CIRCUIT RESISTANCE j,5 MEGOHMS
UC ANODE VOLTAGE j	4000 V	UC ANODE VOLTAGE j4 000 VOLTS
DC GRID #2 VOLTAGE	300 V	DC GRID #2 VOLTAGE 300 VOLTS
DC GRID #1 VOLTAGE C —28 TO —j	2 V	DC GRID #1 VOLTAGE C —28 TO —j2 VOLTS
DC ANODE VOLTAGE j	4000 V	DC ANODE VOLTAGE j4 000 VOLTS