

ELECTRONIC TUBE REFERENCE

17BP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 cathode-ray display tube documented for high-voltage direct-view operation, using magnetic deflection and manufacturer-specified beam focusing and control arrangements appropriate to type 17BP4.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12D	BASE PINS	6
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	
MAXIMUM PLATE VOLTAGE	16000 V
MAXIMUM SCREEN VOLTAGE	410 V
Maximum anode/grid ratings and capacitance presence promoted from supplied Sylvania CRT data. X-ray warning is explicitly published.	

17BP4 — Rectangular Glass Cathode-Ray Picture Tube

The **17BP4** is a 17-inch direct-view rectangular glass cathode-ray tube (CRT) designed primarily for television receiver applications. It features a unipotential cathode, magnetic deflection, magnetic focus, and a specialized gray filter faceplate to enhance picture contrast under ambient light.

The device is part of a family of closely related designs. While the basic **17BP4** does not include an external conductive coating, its variants introduce specific physical modifications:

- **17BP4A:** Identical to the 17BP4 but incorporates an external conductive coating that must be grounded.
- **17BP4B:** Features an aluminized screen in addition to the external conductive coating.
- **17BP4C:** Features a frosted faceplate and an external conductive coating.

Mechanical Specifications and Physical Dimensions

The 17BP4 is constructed with a rectangular glass bulb envelope. Its physical dimensions and screen geometry are standardized as follows:

Dimension	Value
Overall Length	19-1/4 ± 3/8 inches
Greatest Bulb Diagonal	16-5/8 ± 1/8 inches
Greatest Bulb Width	15-3/8 ± 1/8 inches
Greatest Bulb Height	12-1/4 ± 1/8 inches
Minimum Useful Screen Diagonal	15-3/8 inches
Minimum Useful Screen Width	14-1/4 inches
Minimum Useful Screen Height	10-3/4 inches
Standard Raster Size	14-1/4 x 10-3/8 inches

The electrical connection to the high-voltage anode is made via a recessed small cavity cap (J1-21) located on the bulb cone. This anode contact is aligned with the vacant pin position No. 6 on the base within a tolerance of ±30 degrees. The tube utilizes a small shell duodecal 5-pin base (B5-57).

Electrical Connections and Basing

The 17BP4 uses the **12D** basing configuration. This differs from the **12N** (or **12-N**) basing configuration used by the **17BP4A**, which accommodates the external conductive coating. The pin assignments for the **12D** configuration, viewed from the bottom of the base, are detailed below:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 6	Vacant Position (No Connection)
Pin 10	Grid No. 2 (Screen Grid)
Pin 11	Cathode

Pin Number	Connection
Pin 12	Heater
Anode Cap	Grid No. 3 / Anode

Heater and Maximum Ratings

The unipotential cathode is indirectly heated. The heater is designed for operation in series or parallel configurations with standard television receiver power supplies.

Heater Ratings

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 Ampere (approximate)

Design Center Maximum Ratings

The following maximum ratings are established under the Design Center system and must not be exceeded under the worst-case operating conditions:

- **Anode (Grid No. 3) Voltage:** 16,000 Volts DC
- **Grid No. 2 Voltage:** 410 Volts DC
- **Grid No. 1 Voltage:**
 - DC Negative-Bias Value: 125 Volts DC
 - DC Positive-Bias Value: 0 Volts DC
 - Positive-Peak Value: 2 Volts
- **Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode during warm-up (not to exceed 15 seconds): 410 Volts DC
 - Heater negative with respect to cathode after warm-up: 150 Volts DC
 - Heater positive with respect to cathode: 150 Volts DC

Typical Operating Conditions

For optimum performance, the tube should be operated near its recommended typical operating points. Operating the anode below the recommended range results in a noticeable decrease in picture brilliance and definition.

- **Anode (Grid No. 3) Voltage:** 12,000 to 14,000 Volts DC (operation below 12,000 Volts is not recommended)
- **Grid No. 2 Voltage:** 300 Volts DC
- **Grid No. 1 Voltage (for Cutoff):** -33 to -77 Volts DC (required for visual extinction of the undeflected focused spot)
- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum

Focus and Ion Trap Alignment

The 17BP4 requires external magnetic components for focusing and ion separation:

- **Focusing Coil Current:**
 - Approximately **92 ± 10% mA** when using a standard focus coil (such as #109 or equivalent) positioned with its air gap center 3.0 inches from the reference line. This is measured with the combined Grid No. 1 bias and video signal adjusted to produce a highlight brightness of 30 foot-lamberts on a 14-1/4 x 10-3/4 inch picture.
 - Alternatively, approximately **95 mA DC** under similar conditions with the bias adjusted for 20 foot-lamberts of highlight brightness on the same picture area, sharply focused at the center.
- **Ion Trap Magnet:** Requires an external single-field ion trap magnet.
 - **DC Ion Trap Current:** Approximately 70 mA when using a standard coil (such as #111).
 - **Magnetic Field Strength:** Approximately 40 Gauss.

Electrostatic and Optical Characteristics

Interelectrode Capacitances

The interelectrode capacitances of the tube are relatively low. Because the basic 17BP4 lacks an external conductive coating, it does not exhibit the high anode-to-coating capacitance found in its variants:

- **Cathode to all other electrodes:** 5 µf (approximate)
- **Grid No. 1 to all other electrodes:** 6 to 6.5 µf (approximate)
- **External conductive coating to anode (17BP4A only):** 750 µf (minimum) to 1500 µf (maximum)

Optical and Deflection Data

The faceplate is made of a specialized gray filter glass designed to reduce reflections and improve contrast.

- **Faceplate Light Transmission:** Approximately 66% at the center.
- **Phosphor:** Sulfide Type, No. 4 (P4), which produces a white fluorescence and white phosphorescence.
- **Persistence:** Medium.
- **Deflection Angles (Approximate):**
 - Horizontal: 65 to 66 degrees
 - Vertical: 50 degrees
 - Diagonal: 70 degrees

Application and Safety Considerations

Grounding

For the 17BP4, no external grounding of the bulb cone is required because it lacks a conductive coating. However, if a 17BP4A or other coated variant is used as a replacement, the external conductive coating

must be reliably grounded to the receiver chassis. This coating acts as a high-voltage filter capacitor in conjunction with the internal anode coating.

X-Ray Radiation Warning

When operated at or below its nominal maximum rating of 16,000 Volts, the 17BP4 does not typically require additional shielding. However, if the anode voltage exceeds 16,000 Volts (or the maximum rated anode voltage, whichever is less), the tube may produce soft X-rays. In such cases, appropriate shielding must be incorporated into the television receiver cabinet design to protect users from exposure.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Cathode Ray

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Cathode To All Other Electrodes Capacitance	5 pF	Approximate

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	16000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Anode Voltage	14000 V	—

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
Grid 2 voltage	410 V	Published CRT operating condition

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Magnetic text	—
Deflection Method	Magnetic text	—
Fluorescence	White text	—
Persistence	Medium text	—
Phosphor	P4 text	—
Horizontal Deflection Angle	66 deg	Approximate
Diagonal Deflection Angle	70 deg	Approximate
Light Transmittance	66 percent	Approximate
Ion Trap	External Single Field text	—
External Conductive Coating	No text	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	16000 V	—
Maximum Grid2 Voltage	410 V	—
Maximum Grid1 Negative Bias	125 V	—
Maximum Grid1 Positive Peak	2 V	—
Maximum Heater-Cathode Voltage During Warmup	410 V	Duration<=15s
Maximum Heater-Cathode Voltage After Warmup	150 V	EitherPolarity
Anode Voltage	14000 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid2 Voltage	300 V	—
Grid1 Cutoff Voltage Minimum	-77 V	—
Grid1 Cutoff Voltage Maximum	-33 V	—
Focusing Coil Current	95 mA	Approximate
Ion Trap Field Strength	40 gauss	Approximate
Maximum Grid1 Circuit Resistance	1.5 Mohm	—



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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC grid 2 voltage	410 V	—
Maximum grid 1 negative-bias voltage	125 V	NegativeBias
Maximum grid 1 positive-bias voltage	0 V	PositiveBias
Maximum grid 1 positive-peak voltage	2 V	PositivePeak
Peak heater-cathode voltage	410 V	HeaterNegativeWarmup
Peak heater-cathode voltage	150 V	HeaterNegativeAfterWarmup
Peak heater-cathode voltage	150 V	HeaterPositive
DC anode voltage	12000 V	TypicalOperation
DC grid 2 voltage	300 V	TypicalOperation
DC grid 1 voltage	-33--77 V	TypicalOperation
Focusing coil current	92 mA	Approximate
Ion trap current	70 mA	Approximate

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal deflection angle	65 degrees	Approximate
Vertical deflection angle	50 degrees	Approximate
Diagonal deflection angle	70 degrees	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
Grid 1 to all other electrodes capacitance	6.5 pF	Approximate