

ELECTRONIC TUBE REFERENCE

19BVP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch direct-view monochrome television picture tube with electrostatic focusing, magnetic deflection, and an aluminized P4 screen. Manufacturer documentation places it in the high-voltage picture-tube family used for bright, high-contrast receiver display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 6.3 A	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	23500 V
Source-derived physical section; applicable promoted ratings are populated from the printed sheet.	

19BVP4 — Television Picture Tube

A rectangular glass television picture tube featuring a 114-degree magnetic deflection angle, low-voltage electrostatic focusing, and an aluminized P4 phosphor screen.

Overview

The **19BVP4** is a rectangular glass television picture tube designed for use in television receivers. It features a spherical faceplate made of gray filter glass, an aluminized screen utilizing P4 phosphor, and a short neck design. The tube employs low-voltage electrostatic focusing and magnetic deflection, with a nominal diagonal deflection angle of 114 degrees. It does not require an ion trap. An external conductive coating is applied to the bulb, which forms a supplementary filter capacitor when grounded.

Mechanical and Physical Construction

The 19BVP4 is constructed with a J149A1 glass bulb and a short neck to minimize the overall depth of the television cabinet. The physical dimensions and mechanical specifications of the tube are as follows:

- **Overall Length:** 11-3/4 ± 1/4 inches
- **Neck Length:** 4-1/2 ± 1/8 inches
- **Neck Diameter:** Maximum of 1.168 inches at the splice
- **Weight:** 13-1/2 lbs
- **Greatest Dimensions:**
 - Diagonal: 18-5/8 ± 1/8 inches
 - Width: 16-13/32 ± 1/8 inches
 - Height: 13-11/32 ± 1/8 inches
- **Minimum Useful Screen Dimensions (Projected):**
 - Diagonal: 17-9/16 inches
 - Horizontal: 15-1/8 inches
 - Vertical: 12 inches
 - Minimum Useful Projected Area: 172 square inches

The screen size is 12 inches by 15-1/8 inches. The faceplate is spherical and made of gray filter glass with a light transmittance of approximately 78% at the center. The screen uses an aluminized P4 phosphor.

The tube uses a B7-208 wafer base, whose perimeter fits inside a 1-3/4 inch diameter circle. To prevent mechanical stress on the tube neck, the mating socket must have flexible leads to avoid lateral strains. The anode connection is made via a J1-21 recessed small cavity cap on the bulb, which has an angular tolerance of ±30° about the tube axis relative to the alignment of pin 4.

Heater and Electrical Connections

The 19BVP4 is equipped with a heater designed for series or parallel operation.

Heater Ratings

- **Heater Voltage:** 6.3 V
- **Heater Current:** 600 ± 5% mA
- **Heater Warm-up Time:** 11 seconds

The heater warm-up time is defined as the time required for the heater voltage to reach 80% of its rated value when four times the rated voltage is applied to the heater in series with a resistance equal to three times the rated voltage divided by the rated current.

Pinout and Basing (8HR)

The tube utilizes the 8HR basing configuration. The pin connections, viewed from the bottom of the base, are as follows:

Pin	Connection
Pin 1	Heater (H)
Pin 2	Grid No. 1 (G1)
Pin 3	Grid No. 2 (G2)
Pin 4	Grid No. 4 / Focusing Electrode (G4)
Pin 6	Grid No. 1 (G1)
Pin 7	Cathode (K)
Pin 8	Heater (H)
Cap	Anode (A)

Interelectrode Capacitances

- **Cathode to all other electrodes:** Approximately 5 pF
- **Grid 1 to all other electrodes:** Approximately 6 pF
- **External Conductive Coating to Anode:** Maximum 1500 pF, Minimum 1000 pF

The external conductive coating must be grounded, as it forms a supplementary high-voltage filter capacitor in conjunction with the internal anode coating.

Deflection and Focusing

The 19BVP4 utilizes magnetic deflection and low-voltage electrostatic focusing. The approximate deflection angles are:

- **Diagonal:** 114°
- **Horizontal:** 103°
- **Vertical:** 86°

The yoke reference line is determined by JEDEC Reference-Line Gauge No. 126 seated on the funnel. If a permanent magnet (PM) centering magnet is used, its field strength must be between 0 and 8 gauss, and it must not extend more than 2-1/8 inches from the reference line.

Ratings and Operating Conditions

The ratings of the 19BVP4 are established under the Design-Maximum System. All voltages are specified as positive with respect to Grid 1, unless otherwise noted.

Design-Maximum Ratings

- **Anode Voltage:** Maximum 23,500 V, Minimum 12,000 V. Operation below 12,000 V is not recommended because of the resulting decrease in picture brilliance and definition.

- **Grid 4 Voltage (Focusing Electrode):** Maximum +1100 V, Minimum -550 V.
- **Grid 2 Voltage:** Maximum 700 V.
- **Cathode Voltage:**
 - Maximum Negative DC Value: 0 V
 - Maximum Negative Peak Value: 2 V
 - Maximum Positive DC Value: 154 V
 - Maximum Positive Peak Value: 220 V
- **Heater-Cathode Voltage:**
 - Heater negative with respect to cathode:
 - During warm-up period (≤ 15 seconds): Maximum 450 V
 - After warm-up period: Maximum 200 V
 - Heater positive with respect to cathode: Maximum 200 V

Typical Operating Conditions (Cathode Drive Service)

In typical cathode drive service, the voltages are referenced positive with respect to Grid 1:

- **Anode Voltage:** 20,000 V DC
- **Grid 4 Voltage (Focusing Electrode):** 250 V DC
- **Grid 2 Voltage:** 500 V DC. To maintain proper resolution, Grid 2 voltage should not be set below 300 V.
- **Cathode Voltage for Raster Cutoff:** 45 to 95 V DC

Limiting Circuit Values

- **Maximum Grid 1 Circuit Resistance:** 1.5 M Ω
- **Minimum Grid 2 and Grid 4 Circuit Resistance:** 10,000 Ω . A protective resistance of at least this value is recommended in these circuits to prevent damage from momentary internal arcs.

Safety and Installation Notes

Because the 19BVP4 operates at high voltages, safety precautions must be observed:

- **X-Ray Warning:** When the tube is operated at anode voltages above 16 kV, soft X-ray radiation may be produced. Appropriate shielding may be required to protect users from prolonged exposure.
- **Handling:** The tube weighs 13-1/2 lbs and has a large evacuated glass envelope. It must be handled with care to avoid implosion.

Technical Summary

The **19BVP4** is a 114-degree magnetic deflection, low-voltage electrostatic focus television picture tube. It features a rectangular glass envelope with a spherical gray filter glass faceplate, an aluminized P4 phosphor screen, and a short neck. Operating with a 6.3 V, 600 mA heater, it is designed for cathode drive service with a typical anode voltage of 20,000 V. The tube incorporates an external conductive coating

that acts as a supplementary filter capacitor when grounded, and utilizes an 8HR basing configuration on a B7-208 wafer base.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1947 Westinghouse

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

1947 WESTINGHOUSE

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal. 00 v 00 i i e e e	23500 deg	Horizontal. 00 v 00 i i e e e 103 Degrees Maximum Anode Voltage 23500 Volts
Vartical ... o e e e	12000 deg	Vartical ... o e e e 36 Degrees Minimum Ancde Voltage (Nete 2) 12000 Volts
Biagonal e	4 deg	Biagonal e 114 Degrees Maximum Grid 4 Voltage {Focusing
Cathode to all other electrodes, (Approx.),	706 V	Cathode to all other electrodes, (Approx.), . . 5 fLpef Maximum Grid 2 Voltage 706G Volts
.. 2 Volts	2 V	.. 2 Volts
oy	154 V	oy 154 Volts DC
Heater Current at	6.3 V	Heater Current at 6.3 volts, , , .., ...
... 500 * 5% Ma., Moximum Positive Peak Value 220 Volts	220 V	... 500 * 5% Ma., Moximum Positive Peak Value 220 Volts
. 11 Seconds Maximum Heater«Cathode Voltage	11 s	. 11 Seconds Maximum Heater«Cathode Voltage
15seconds v vt i e 450 Yolts	450 s	15seconds v vt i e 450 Yolts
MECHANICAL: Heater positive with raspect to cathode	200 V	MECHANICAL: Heater positive with raspect to cathode .. . 200 Volts
Overall Length . ,	4 Inches	Overall Length . , ... 11-3/4 + 1/4 Inches
Width e	8 inches	Width e 16-13/32 +1/8 inches Unless Otherwise Specified, All Voltage Values
Height oo,	1 Inches	Height oo, 13-11/32 £ 1/8 Inches ore Positive with Respect to Grid 1.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Minimum Useful Screen Dimensions {Projected): Anode Voltage	20000 V	Minimum Useful Screen Dimensions {Projected): Anode Voltage 20000 Volts DC
Diagonal v	250 Inches	Diagonal v 17-2/16 Inches Grid 4 Voltage (Focusing Electrode) . . . 250 Volts DC
Horizontal oo v i v v vy	500 Inches	Horizontal oo v i v v vy 15-1/8 Inches Grid 2 Voltage (Note 3) 500 Volts DC
Vertical v i	95 V	Vertical v i 12 Inches Cathode Voltage for raster cutoff. 45 to 95 Volts DC
Neck Length	8 Inches	Neck Length 4.1/2+1/8 Inches
Maximum Grid	1.5 Mohm	Maximum Grid 1 Circuit Resistance 1.5 Megohms
Bulb i y e e e e e e e e J1	10000 ohm	Bulb i y e e e e e e e e J149A1 Minimum Grids 2 & 4 Circuit Resistance [Note 4] 10000 Ohms
Basing o v v v v s e e e e e e e e s	80 V	Basing o v v v v s e e e e e e e e s 8HR voltage across the heater to reach 80% of its rated value after
Weight . . . L . e	4 V	Weight . . . L . e 13-1/2 Pounds applying 4 times rated heater voltage to a circuit consisting of
It is recommended that not less than	2 mm	. It is recommended that not less than 300 volts on Grid 2 be
X-RAY WARNING: Operation with voltages in excess of	16 V	X~RAY WARNING: Operation with voltages in excess of 16KV may

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
ATBO L v e e e	5 Inches	ATBO L v e e e 172 5q. Inches



SOURCE DATA APPENDIX

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.

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Maximum anode voltage	23500 V	—
Maximum grid 2 voltage	700 V	—
Maximum positive cathode voltage	154 V	—
Maximum positive peak cathode voltage	220 V	—
Minimum recommended anode voltage	12000 V	—
Maximum focusing electrode voltage	1100 V	Positive limit

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	—
Grid 1 to all other electrodes capacitance	6 pF	—