

ELECTRONIC TUBE REFERENCE

19ACP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Wide-angle P4 monochrome television picture tube designed for high-voltage direct-view service, with magnetic deflection and manufacturer warnings concerning X-ray shielding at elevated anode voltages.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
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	20000 V
Source-derived physical section; applicable promoted ratings are populated from the printed sheet.	

19ACP4 — Television Picture Tube

The **19ACP4** is a rectangular glass television picture tube designed for use in television receivers. It features a 114-degree magnetic deflection system and a low-voltage electrostatic focusing system. The tube incorporates an aluminized screen with a P4 phosphor, a gray filter glass, and a spherical faceplate. It has a minimum useful projected screen area of 172 square inches. The 19ACP4 operates without the need for an ion trap and includes an external conductive coating that acts as a supplementary filter capacitor when grounded.

Mechanical Specifications and Physical Dimensions

The 19ACP4 utilizes a J149 glass bulb with a B7-208 base and an 8HR basing configuration. The anode connection is made via a J1-21 recessed small cavity cap.

Physical Dimensions

- **Overall Length:** $12\text{-}3/8 \pm 1/4$ inches
- **Neck Length:** $5\text{-}1/8 \pm 1/8$ inches
- **Greatest Diagonal Dimension:** $18\text{-}5/8 \pm 1/8$ inches
- **Greatest Width:** $16\text{-}13/32 \pm 1/8$ inches
- **Greatest Height:** $13\text{-}11/32 \pm 1/8$ inches
- **Maximum Neck Diameter (at splice):** 1.168 inches
- **Weight:** 13-1/2 lbs.

Screen Characteristics

- **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
- **Phosphor:** Aluminized P4
- **Faceplate:** Spherical gray filter glass

Installation and Handling Precautions

To prevent damage to the tube and ensure safe operation, several mechanical constraints must be observed:

- **Base Pin Strain:** Lateral strains on the base pins must be avoided. The socket should be equipped with flexible leads. The base wafer perimeter fits inside a 1-3/4 inch diameter circle concentric with the tube axis.
- **Anode Terminal Alignment:** The alignment of the anode cap terminal with Pin 4 has an angular tolerance of $\pm 30^\circ$ about the tube axis.
- **Centering Magnet:** If a permanent magnet (PM) centering magnet is used, it should provide a field of 0 to 8 gauss and must not extend more than 2-1/8 inches from the Yoke Reference Line.

Heater and Electrical Characteristics

Heater Ratings

The heater is designed for operation in series-string or parallel configurations.

- **Heater Voltage:** 6.3 V
- **Heater Current:** 600 ± 30 mA
- **Heater Warm-up Time:** 11 seconds. This warm-up time is defined as the time required to reach 80% of the rated heater voltage when tested in series with a resistance equal to three times the rated heater voltage divided by the rated heater current, after applying four times the rated heater voltage.

Pinout and Basing (8HR)

The 19ACP4 uses an 8-pin base with the 8HR basing arrangement. Depending on the specific wiring standard applied, there is a variation in the assignment of Pin 1 and Pin 2:

- **Configuration A:** Pin 1 is Grid No. 1, Pin 2 is the Heater.
- **Configuration B:** Pin 1 is the Heater, Pin 2 is Grid No. 1.

The remaining pin connections are consistent across both configurations:

- **Pin 3:** Grid No. 2
- **Pin 4:** Grid No. 4 (Focusing Electrode)
- **Pin 6:** Grid No. 1
- **Pin 7:** Cathode
- **Pin 8:** Heater
- **Recessed Cavity Cap:** Anode (Grids No. 3 and No. 5, Screen, Collector)

Electrostatic Capacitances

- **Cathode to all other electrodes:** approximately 5 pF
- **Grid No. 1 to all other electrodes:** approximately 6 pF
- **External conductive coating to anode:** 1000 pF (minimum) to 1500 pF (maximum)

The external conductive coating must be grounded to the receiver chassis to utilize its properties as a supplementary high-voltage filter capacitor.

Design-Maximum Ratings

The ratings below are established under the Design-Maximum System. Unless otherwise specified, all voltage values are positive with respect to Grid No. 1.

Parameter	Rating
Maximum Anode Voltage	20,000 V
Minimum Anode Voltage	12,000 V
Grid No. 4 (Focusing Electrode) Voltage	-550 V to +1100 V
Maximum Grid No. 2 Voltage	70 V
Cathode Voltage	
- Maximum Negative DC Value	0 V
- Maximum Negative Peak Value	2 V
- Maximum Positive DC Value	154 V

Parameter	Rating
- Maximum Positive Peak Value	220 V
Heater-Cathode Voltage	
- Heater negative to cathode (during warm-up <= 15 s)	450 V
- Heater negative to cathode (after warm-up)	200 V
- Heater positive to cathode	200 V

Operation of the tube below the minimum recommended anode voltage of 12,000 V is not recommended, as both screen brilliance and picture definition decrease significantly.

Typical Operating Conditions (Cathode Drive Service)

In typical cathode-drive applications, all voltages are specified as positive with respect to Grid No. 1:

- **Anode Voltage:** 14,000 V DC
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 to 400 V DC
- **Grid No. 2 Voltage:** 50 V DC
- **Cathode Voltage for Raster Cutoff:** 35 to 50 V DC

Limiting Circuit Values

To protect the tube from internal arcing and damage, the following circuit resistance limits must be maintained:

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms
- **Minimum Grid No. 2 and Grid No. 4 Circuit Resistance:** 10,000 Ohms. A protective series resistance of at least this value is highly advisable in the Grid No. 2 and Grid No. 4 electrode circuits.

Safety and Operating Warnings

- **X-Ray Radiation:** When the 19ACP4 is operated at anode voltages exceeding 16,000 V, it may produce soft X-rays. Appropriate shielding must be provided in the receiver design to limit exposure and ensure operator safety.
- **High Voltage and Grounding:** The external conductive coating must be securely grounded. This coating, in conjunction with the internal anode, forms a high-voltage filter capacitor that can retain a lethal charge even after the receiver is turned off. Proper discharge procedures must be followed before handling the tube.

Technical Summary

The **19ACP4** is a 114-degree magnetic deflection, low-voltage electrostatically focused rectangular television picture tube. It features an aluminized P4 phosphor screen with a spherical gray filter glass faceplate providing a minimum useful projected area of 172 square inches. Operating with a 6.3 V, 600 mA heater, the tube features a controlled 11-second warm-up time. It is rated for a maximum anode voltage of 20,000 V (with a recommended minimum of 12,000 V) and is typically operated in cathode-drive service with an anode potential of 14,000 V. The tube requires no ion trap, utilizes an 8HR basing configuration, and incorporates an external conductive coating that must be grounded to serve as a supplementary filter capacitor.

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
Gray Filter Glass Low G2 Voltage (	8 V	Gray Filter Glass Low G2 Voltage (50 Volts) 12" < 15-1/8" Screen Size
Horizontel , ... o,	20000 deg	Horizontel , ... o, 103 Degrees Maximum Anode Voltage 20000 Volts
Yertical	12000 deg	Yertical 0 it e e e e e 86 Degrees Minimum Anode Voltagea 12000 Vaolts
Diagonal e	4 deg	Diagonal e 114 Degrees Maximum Grid 4 Voltage {Focusing
Cathode to all other electrodes, {(Approx.)	70 V	Cathode to all other electrodes, {(Approx.). 5 ek Maximum Grid 2 Voltage 70 Yolts
Grid to all other slectrodes, (Approx.)	11 V	Grid to all other slectrodes, (Approx.) 11 et Cathode Voltage:
Maximum o oo v v e e	2 V	Maximum o oo v v e e 1500 e Maximum Negative Peak Value 2 Volts
Minimum . . . o e	154 pF	Minimum . . . o e 1000 pLpf Maximum Positive Yalve 154 Vohts OC
Heater Warm-up Timee	11 s	Heater Warm-up Timee 11 Seconds Maximum Heater-Cathode Yoltage
Light Troansmittance at Center, Approximate	450 s	Light Troansmittance at Center, Approximate 78 Percent 15 seconds. . 450 Volts
MECHANICAL: Heater positive with respect to cathode	200 V	MECHANICAL: Heater positive with respect to cathode 200 Volts
Overall Length	4 Inches	Overall Length 12-3/8 f 1/4 Inches
Diagonal o	8 Inches	Diagonal o 18-5/8 + 1/8 Inches CATHODE DRIVE SERVICE:

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Width. o i t i	8 inches	Width. o i t i 16-13/32 £ 1/8 inches Unless Otherwise Specified, All Voltage Values
Haight	1 Inches	Haight. 13-11/32 £ /8 Inches are Positive with Respect to Grid 1.
Minimum Useful Screen Dimensions (Projected): Anode Voltage	14000 V	Minimum Useful Screen Dimensions (Projected): Anode Voltage 14000 Volts DC
.. . . . 17:9/16 Inches Grid 4 Voltage {Focusing Electrode)	400 Inches	 17:9/16 Inches Grid 4 Voltage {Focusing Electrode) 010 400 Volts DC
Horizontal	50 Inches	Horizontal 15-1/8 Inches Grid 2 Voltage. i 50 Volts OC
Vertical ,	50 Inches	Vertical , 12 Inches Cathoda Voltage for raster cutoff 3510 50 Volts DC
ArBA o o v e e e e e,	5 Inches	ArBA o o v e e e e e, 172 5g. Inches
Neck Length	8 Inches	Neck Length. 5-1/8 = 1/8 Inches LIMITING CIR.CUT VAL.UES:.
Bolb o v o oo	1.5 Mohm	Bolb o v o oo 1149 Maximum Grid 1 Circuit Resistance 1.5 Megohms
BULb Contact. « oot e e J1	10000 ohm	BULb Contact. « oot e e J1-21 Minimum Grids 2 & 4 Circuit Resistoncet. . . . 10000 Ohms
Weight o e e e e	4 V	Weight o e e e e 13-1/2 Lbs, applying 4 times rated heater voltage to a circuit consisting af
4 Brilliance and definition decrease with decreosing anode voltage.	4 V	4 Brilliance and definition decrease with decreosing anode voltage.
Operation with anode voltage less than	12000 V	Operation with anode voltage less than 12000 volts in not rec-
X-RAY WARNING: Operotion with voltages in excess of	16 V	X—RAY WARNING: Operotion with voltages in excess of 16KV may

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Direct Interslactrode Capacitances: Electrode) #	550 V	Direct Interslactrode Capacitances: Electrode) #1100, ~550 Volts

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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Maximum anode voltage	20000 V	—
Maximum grid 2 voltage	70 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	—

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