

ELECTRONIC TUBE REFERENCE

19DWP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch direct-view monochrome television CRT with electrostatic focus, magnetic deflection, and an aluminized P4 white screen. Its 110-degree-class scanning and high-voltage operation support large-screen receiver display service with published X-ray precautions.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8HR	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	23000 V
Cathode-ray picture-tube section; anode rating and published direct capacitances captured from supplied family sheet.	

19DWP4 — Rectangular Glass Television Picture Tube

The **19DWP4** is a 19-inch direct-viewed rectangular glass television picture tube designed for use in television receivers. It features electrostatic focusing and magnetic deflection, utilizing an aluminized P4 phosphor screen that produces white fluorescence with medium-short persistence. The tube is constructed with integral implosion protection and does not require an external ion trap.

Mechanical Design and Physical Construction

The 19DWP4 is built using the J149F glass bulb envelope, featuring a spherical gray filter glass faceplate with an approximate light transmittance of 49%. The tube incorporates a banded integral implosion protection system consisting of a tension band and a rim band. To ensure proper operation and safety, the external conductive coating and the rimbands must be grounded.

Physical Dimensions and Weight

- **Overall Length:** 11 3/8 ± 1/4 inches
- **Neck Length:** 4 1/8 to 4 1/4 inches (with a tolerance of ± 1/8 inch)
- **Neck Diameter:** 1 1/8 inches
- **Weight:** Approximately 15 lbs
- **Bulb Contact:** Recessed small cavity cap (J1-21)
- **Base:** B7-208 (8HR basing configuration)

Screen Characteristics

- **Minimum Useful Screen Dimensions:** 12 inches Height x 15 3/8 to 15 3/4 inches Width x 17 9/16 inches Diagonal
- **Minimum Useful Screen Area:** 172 square inches
- **Phosphor:** Aluminized P4 (white fluorescence, medium-short persistence)

Electrical Characteristics and Basing

The 19DWP4 features an indirectly heated cathode. The heater is designed to operate under specified warm-up conditions to ensure reliability in series-string receiver designs.

Heater Ratings

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.45 ± 5% A
- **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 heater voltage is applied in series with an external resistance equal to three times the rated heater voltage divided by the rated current.

Pinout and Terminal Connections

The tube utilizes an 8-pin B7-208 base with an 8HR basing arrangement. The pin connections, viewed from the bottom of the base, are as follows:

Pin Number	Connection
Pin 1	Heater

Pin Number	Connection
Pin 2	Grid No. 1
Pin 3	Grid No. 2
Pin 4	Grid No. 4 (Focusing Electrode)
Pin 6	Grid No. 1
Pin 7	Cathode
Pin 8	Heater
Recessed Cap	Anode (Grid No. 3, Grid No. 5, Screen)

The recessed small cavity cap (J1-21) is located on the same side of the envelope as Pin 4 and aligns with the horizontal centerline of the tube within a tolerance of 30°.

Interelectrode Capacitances and Resistance

- **Cathode to all other electrodes:** 5 pF (approximate)
- **Grid No. 1 to all other electrodes:** 6 pF (approximate)
- **External conductive coating and rimbands to anode:** 1000 pF minimum, 1500 pF maximum
- **Resistance between external conductive coating and metal bands:** 50 Megohms minimum

Operating Modes and Maximum Ratings

The 19DWP4 can be operated in either Grid Drive Service or Cathode Drive Service. The maximum ratings are defined under the Design-Maximum rating system.

Grid Drive Service

In Grid Drive Service, electrode voltages are specified with respect to the cathode.

- **Anode Voltage:** 11,000 Vdc minimum to 23,000 Vdc maximum
- **Grid No. 4 (Focusing Electrode) Voltage:** -550 Vdc to +1100 Vdc
- **Grid No. 2 Voltage:** 200 Vdc minimum to 550 Vdc maximum
- **Grid No. 1 Voltage:**
 - Negative bias value: 154 Vdc maximum
 - Negative peak value: 220 V maximum
 - Positive bias value: 0 Vdc maximum
 - Positive peak value: 2 V maximum

Typical Operating Conditions (Grid Drive)

- **Anode Voltage:** 20,000 Vdc
- **Grid No. 4 Voltage for Focus:** -200 to +200 Vdc

- **Grid No. 2 Voltage:** 400 Vdc
- **Grid No. 1 Voltage for Cutoff:** -50 to -98 Vdc (for visual extinction of a focused raster; the absolute value increases by approximately 5 V for an undeflected focused spot)

Cathode Drive Service

In Cathode Drive Service, electrode voltages are specified with respect to Grid No. 1.

- **Anode Voltage:** 11,000 Vdc minimum to 23,000 Vdc maximum
- **Grid No. 4 (Focusing Electrode) Voltage:** -400 Vdc to +1250 Vdc
- **Grid No. 2 Voltage:** 350 Vdc minimum to 700 Vdc maximum
- **Cathode Voltage:**
 - Positive bias value: 154 Vdc maximum
 - Positive peak value: 220 V maximum
 - Negative bias value: 0 Vdc maximum
 - Negative peak value: 2 V maximum

Typical Operating Conditions (Cathode Drive)

- **Anode Voltage:** 20,000 Vdc
- **Grid No. 4 Voltage for Focus:** -200 to +200 Vdc
- **Grid No. 2 Voltage:** 400 Vdc
- **Cathode Voltage for Cutoff:** 48 to 82 Vdc (for visual extinction of a focused raster; the absolute value increases by approximately 5 V for an undeflected focused spot)

Heater-Cathode Voltage Limits (Both Services)

- **Heater Negative with Respect to Cathode:**
 - During the equipment warm-up period (not to exceed 15 seconds): 450 V maximum
 - After the equipment warm-up period: 300 V maximum
- **Heater Positive with Respect to Cathode:**
 - Total value: 200 V maximum
 - DC component: 100 V maximum

Circuit Constraints and Safety Considerations

Circuit Values

The maximum allowable resistance in the Grid No. 1 circuit is **1.5 Megohms**.

X-ray Radiation Warning

When operating the 19DWP4, safety precautions regarding X-ray radiation must be observed. If the tube is operated at anode voltages higher than 16,000 volts or the maximum rated anode voltage (whichever is less), shielding may be necessary to protect personnel against prolonged exposure at close range.



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

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P4	—
Focusing method	Electrostatic	—
Deflection method	Magnetic	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—



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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
FocusingMethod	Electrostatic	—
DeflectionMethod	Magnetic	—
Phosphor	Aluminized P4 white	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DeflectionAngles	110-class magnetic	—
Cathode To All Capacitance	5 pF	—
Grid1 To All Capacitance	6 pF	—
ExternalConductiveCoatingToAnodeCapacitanceMaximum	1500 pF	—
ExternalConductiveCoatingToAnodeCapacitanceMinimum	1000 pF	—
RimbandToExternalCoatingResistanceMinimum	50 Mohm	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
AnodeVoltageMaximum	23000 V	—
AnodeVoltageMinimum	15000 V	—
FocusingElectrodeVoltageRangeMaximum	-400 to +1250 V	—
Grid2VoltageMaximum	550 V	—
Grid2VoltageMinimum	200 V	—
Grid1NegativeBiasMagnitudeMaximum	155 V	—
Grid1PositivePeakVoltageMaximum	2 V	—
HeaterCathodeVoltageMaximum	450 V	Warmup<=15s;HeaterNegative
HeaterCathodeVoltageMaximum	200 V	AfterWarmup
HeaterCathodeVoltageMaximum	200 V	HeaterPositive
Anode Voltage	20000 V	—
FocusingElectrodeVoltage	0 to +400 V	—
Grid1VoltageForCutoff	-42 to -78 V	—
Grid1CircuitResistanceMaximum	1.5 Mohm	—