

ELECTRONIC TUBE REFERENCE

# 19DP4A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

**1 SECTION**  
CONSTRUCTION  
**CATHODERAY**

Nineteen-inch direct-view television picture tube with magnetic focusing, approximately 56-degree deflection, and a white P4 medium-persistence screen. It provides a large monochrome image for conventional receiver display service.

## GENERAL CHARACTERISTICS

|                     |                   |                      |               |
|---------------------|-------------------|----------------------|---------------|
| BASE DESIGNATION    | 12N               | BASE PINS            | 5             |
| 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                                                        | 1 V  |
| MAXIMUM SCREEN VOLTAGE                                                       | 41 V |
| CRT-specific electrode, focusing and deflection data retained as parameters. |      |

### 19DP4A — Direct-View Television Picture Tube

The **19DP4A** is a direct-view, round glass picture tube designed primarily for television receiver applications. It features magnetic focus and magnetic deflection, utilizing a unipotential cathode and an external single-field ion trap. The tube is constructed with an external conductive coating that, when grounded, serves as a filter capacitor in the high-voltage anode circuit.

A key distinction between the 19DP4A and its predecessor, the 19DP4, lies in the faceplate treatment: while the standard 19DP4 uses a clear glass faceplate, the 19DP4A is equipped with a grey filter faceplate to improve picture contrast under ambient room lighting.

## Physical and Mechanical Specifications

The 19DP4A is a physically substantial cathode-ray tube with a round glass envelope. Its mechanical dimensions and alignment tolerances are highly specified to ensure proper mounting and deflection yoke positioning:

- **Greatest Diameter of Bulb:** 18 7/8 ± 1/8 inches
- **Overall Length:** 21 1/2 ± 3/8 inches
- **Minimum Useful Screen Diameter:** 17 3/8 inches
- **Typical Raster Size:** 11 3/4" x 15 3/4"

The tube uses a **small shell duodecal 5-pin base** (designated B5-57) with a **12N** basing configuration. High-voltage anode connection is made via a recessed small cavity cap (J1-21) located on the bulb cone. This anode contact is precisely aligned with pin position #3 within a tolerance of ±10 degrees to facilitate neat and safe high-voltage cabling.

## Heater and Pin Connections

The 19DP4A is equipped with an indirectly heated unipotential cathode. The heater is designed for parallel operation in television chassis.

| Heater Parameter        | Value  |
|-------------------------|--------|
| Nominal Heater Voltage  | 6.3 V  |
| Nominal Heater Current  | 0.6 A  |
| Calculated Heater Power | 3.78 W |

The bottom-view pinout configuration of the B5-57 base and the anode cap is defined as follows:

| Pin / Connection  | Electrode                               |
|-------------------|-----------------------------------------|
| Pin 1             | Heater                                  |
| Pin 2             | Grid No. 1 (Control Grid)               |
| Pin 10            | Grid No. 2 (Screen Grid)                |
| Pin 11            | Cathode                                 |
| Pin 12            | Heater                                  |
| Anode Cap (J1-21) | Anode (Grid No. 3 / Screen / Collector) |

## Optical Characteristics

The screen of the 19DP4A utilizes **Phosphor No. 4**, which is optimized for monochrome television display.

- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium
- **Faceplate Light Transmission:** Approximately 70% at the center of the screen (specifically enabled by the grey filter glass of the "A" variant).

## Interelectrode Capacitances and Deflection

The external conductive coating on the bulb envelope forms a capacitor with the internal anode coating. The capacitance values are:

- **External Conductive Coating to Anode (Maximum):** 2,500  $\mu\text{f}$
- **External Conductive Coating to Anode (Minimum):** 750  $\mu\text{f}$

The tube is designed for a nominal deflection angle of **56 degrees**, requiring standard magnetic deflection yoke components.

## Design Center Ratings

The following absolute maximum and minimum limits are established under the Design Center Rating System. Operating the tube beyond these limits can impair performance and shorten its service life.

| Parameter                                                                       | Rating   |
|---------------------------------------------------------------------------------|----------|
| Maximum DC Anode Voltage                                                        | 17,000 V |
| Maximum DC Grid No. 2 Voltage                                                   | 410 V    |
| Maximum DC Negative-Bias Grid No. 1 Value                                       | 125 V    |
| Maximum DC Positive-Bias Grid No. 1 Value                                       | 0 V      |
| Maximum Positive-Peak Grid No. 1 Value                                          | 2 V      |
| Maximum DC Peak Heater-Cathode Voltage<br>(Heater negative, warm-up $\leq$ 15s) | 410 V    |
| Maximum DC Peak Heater-Cathode Voltage<br>(Heater negative, after warm-up)      | 125 V    |
| Maximum DC Peak Heater-Cathode Voltage<br>(Heater positive)                     | 125 V    |

The maximum allowable control grid (Grid No. 1) circuit resistance is **1.5 Megohms**.

## Typical Operating Conditions

Under typical operating conditions, the 19DP4A is operated with an anode potential of 13,000 Volts. Focusing and ion-trap alignment require external magnetic fields adjusted to specific current levels.

| Parameter                                                                 | Typical Value   |
|---------------------------------------------------------------------------|-----------------|
| DC Anode Voltage                                                          | 13,000 V        |
| DC Grid No. 2 Voltage                                                     | 250 V           |
| DC Grid No. 1 Voltage (for visual extinction of undeflected focused spot) | -26 to -63 V    |
| DC Focusing Coil Current (Approximate)                                    | 146 mA          |
| DC Ion Trap Current (Approximate, Standard Coil)                          | 75 $\pm$ 50% mA |

The typical focusing coil current of **146 mA** is specified using a standard focus coil #109 (or equivalent), with the focus coil air gap center positioned 3.25 inches from the reference line. This operating point is measured with the combined Grid No. 1 bias and video signal adjusted to produce a highlight brightness of 25 foot-lamberts on the standard 11 3/4" x 15 3/4" picture area.

## Technical Summary

The **19DP4A** is a 19-inch class, round glass television picture tube featuring a grey filter faceplate with approximately 70% light transmission for enhanced contrast. It utilizes magnetic focus and 56-degree magnetic deflection, requiring an external single-field ion trap and a standard focusing coil. Operating at a typical anode voltage of 13,000 V (with a design center maximum of 17,000 V), the tube provides a white-phosphor monochrome display (Phosphor No. 4) with medium persistence. Its electrical interface consists of a small shell duodecal 5-pin base and a recessed small cavity anode cap, supported by a standard 6.3 V, 0.6 A heater.



## SOURCE OPERATING CONDITIONS

# 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 |
| Maximum Anode Voltage | 17000 V         | —                |
| Typical Anode Voltage | 13000 V         | —                |
| Maximum Grid2 Voltage | 410 V           | —                |
| Typical Grid2 Voltage | 250 V           | —                |

| CHARACTERISTIC             |                 |                  |
|----------------------------|-----------------|------------------|
| PARAMETER                  | PUBLISHED VALUE | CONDITION / NOTE |
| DeflectionAngleApproximate | 56 degree       | —                |
| FocusingMethod             | Magnetic        | —                |
| DeflectingMethod           | Magnetic        | —                |
| PhosphorNumber             | 4               | —                |
| FluorescentColor           | White           | —                |
| Persistence                | Medium          | —                |



## 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

| CHARACTERISTICS                              |                   |                                                                                                                   |
|----------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------|
| PARAMETER                                    | PUBLISHED VALUE   | CONDITION / NOTE                                                                                                  |
| 11 3~'a" % 15 3~N" RASTER SIZE – value 1     | <b>3</b>          | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| 11 3~'a" % 15 3~N" RASTER SIZE – value 2     | <b>15</b>         | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| 11 3~'a" % 15 3~N" RASTER SIZE – value 3     | <b>3</b>          | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| DEFLECTION ANGLE (APPROX.)                   | <b>56 degrees</b> | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| HEATER POSITIVE WITH RESPECT TO CATHODE      | <b>125 V</b>      | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| OC ION TRAP CURRENT STANDARD COIL (APPROX.)  | <b>75 mA</b>      | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| FO R, STANDARD FOCUS COIL 1109, OR – value 1 | <b>1109 V</b>     | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| FO R, STANDARD FOCUS COIL 1109, OR – value 2 | <b>111 V</b>      | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| VIDEO SIGNAL                                 | <b>25 V</b>       | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| 11 3/μ" BY 15 3/μ+ PICTURE SIZE. – value 1   | <b>3</b>          | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| 11 3/μ" BY 15 3/μ+ PICTURE SIZE. – value 2   | <b>15</b>         | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| 11 3/μ" BY 15 3/μ+ PICTURE SIZE. – value 3   | <b>3</b>          | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |

| OTHER                                         |                 |                                                                                                                   |
|-----------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------|
| PARAMETER                                     | PUBLISHED VALUE | CONDITION / NOTE                                                                                                  |
| MAXIMUM OC ANODE VOLTAGE                      | 1 V             | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| MAXIMUM DC GRID #2 VOLTAGE – value 1          | 2 V             | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| MAXIMUM DC GRID #2 VOLTAGE – value 2          | 41 V            | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| MAXIMUM GRID #1 VOLTAGE                       | 1 V             | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| MAXIMUM GR 10 #i CIRCUIT RESISTANCE – value 1 | 10 mA           | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |
| MAXIMUM GR 10 #i CIRCUIT RESISTANCE – value 2 | 1.5 mA          | Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits. |

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