



## CATHODE-RAY TUBE

### TYPE 19WP-

The Du Mont Type 19WP- is a 19-inch diameter metal cone, electrostatic focus cathode-ray tube. The 19WP- incorporates a unique gun design which uses both electrostatic and magnetic deflection.

The electrostatic deflection plates are designed to scan a small raster area which can be deflected to any portion of the screen by the magnetic deflection yoke. By using either monoscope tubes or symbol type generators, it is possible to provide letters or characters along with the display formed by the magnetic deflection yoke. The size of these characters can be varied from about 3/8 inch to over 1 inch, depending upon the amplitude of the deflection voltages applied and the desired tube face area to be scanned.

The gun design used provides a small, dense electron beam and coupled with the electrostatic focus lens high resolution is provided. The high current density beam permits symbol formation in minimum time.

A gray filter-glass faceplate provides the maximum small area contrast. To increase the light output and to prevent build-up of spurious charges on the screen by successive transients, the screens are metal backed.

## GENERAL CHARACTERISTICS

### Electrical Data

Focusing Method	Electrostatic	
Deflection Method <sup>1</sup>	Electrostatic and Magnetic	
Deflection Angle, Approximate	66	Degrees
Direct Interelectrode Capacitances, Approximate		
Cathode to all	4.0	μf
Grid No. 1 to all	5.0	μf
D1 to D2	1.6	μf
D3 to D4	1.6	μf
D1 to all	2.5	μf
D2 to all	2.5	μf
D3 to all	2.5	μf
D4 to all	2.5	μf

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#### GENERAL CHARACTERISTICS (Continued)

##### Optical Data

Phosphor No. <sup>2</sup>	2	7	12	14	19	25
Fluorescent Color	Blue-Green	Blue-White	Orange	Purple	Orange	Orange
Phosphorescent Color	Green	Yellow	Orange	Orange	Orange	Orange
Persistence	Long	Long	Medium-Long	Medium-Long	Very Long	Very Long

Faceplate Light Transmission at Center, Approximate	55	Percent
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##### Mechanical Data

Overall Length	24 11/16 ± 3/8	Inches
Greatest Diameter of Bulb	18 5/8 ± 1/8	Inches
Minimum Useful Screen Diameter	17 3/8	Inches
Neck Length <sup>3</sup>	10 5/16 ± 3/16	Inches

Base	B7-51	
Basing	12AV	
Base Alignment:		
D3D4 trace aligns with Pin No. 2 and tube axis	± 30	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 2		
Angle between D3D4 and D1D2 traces	90 ± 2	Degrees

#### RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	13,200	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	6,000	Max. Volts DC
Grid No. 2 Voltage	770	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts



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#### RATINGS (Design Maximum Values) (Continued)

<b>Peak Heater-Cathode Voltage</b>		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode		
	180	Max. Volts
 Peak Voltage between Accelerator and any Deflection Electrode	 550	 Max. Volts

#### TYPICAL OPERATING CONDITIONS

Accelerator Voltage	10,000	7500	Volts DC
Focusing Electrode Voltage <sup>4</sup>	3400 to 4600	2550 to 3450	Volts DC
Grid No. 2 Voltage	300	300	Volts DC
Grid No. 1 Voltage <sup>5</sup>	-35 to -72	-35 to -72	Volts DC
Modulation <sup>6</sup>	15	15	Max. Volts
 Deflection Factors:			
D1D2	170 to 210	128 to 160	Volts DC/Inch
D3D4	160 to 200	121 to 150	Volts DC/Inch
Focusing Electrode Current for any operating condition		-15 to +10	μA
Spot Position (focused and undeflected) <sup>7</sup>		Within a 25-mm Square	
Line Width "A" <sup>8</sup>	0.024	0.026	Max. Inch

For accelerator voltage not shown in the preceding table, the following can be used as a guide:

Focusing Electrode Voltage	34% to 46% of Accelerator Volts
D1D2	17 to 21 Volts DC/Inch/Kilovolt of Accelerator Volts
D3D4	16 to 20 Volts DC/Inch/Kilovolt of Accelerator Volts

#### MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit <sup>9</sup>	5.0	Max. Megohms

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**NOTES**

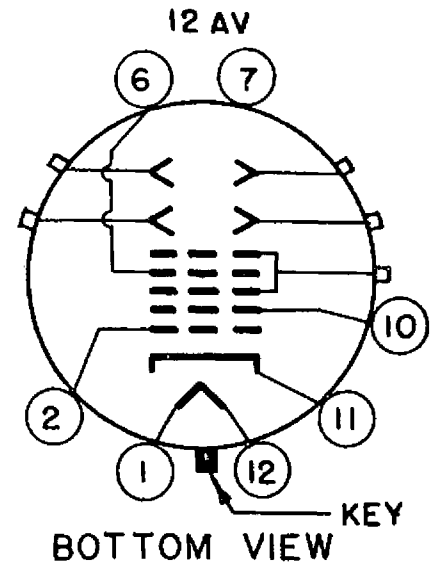
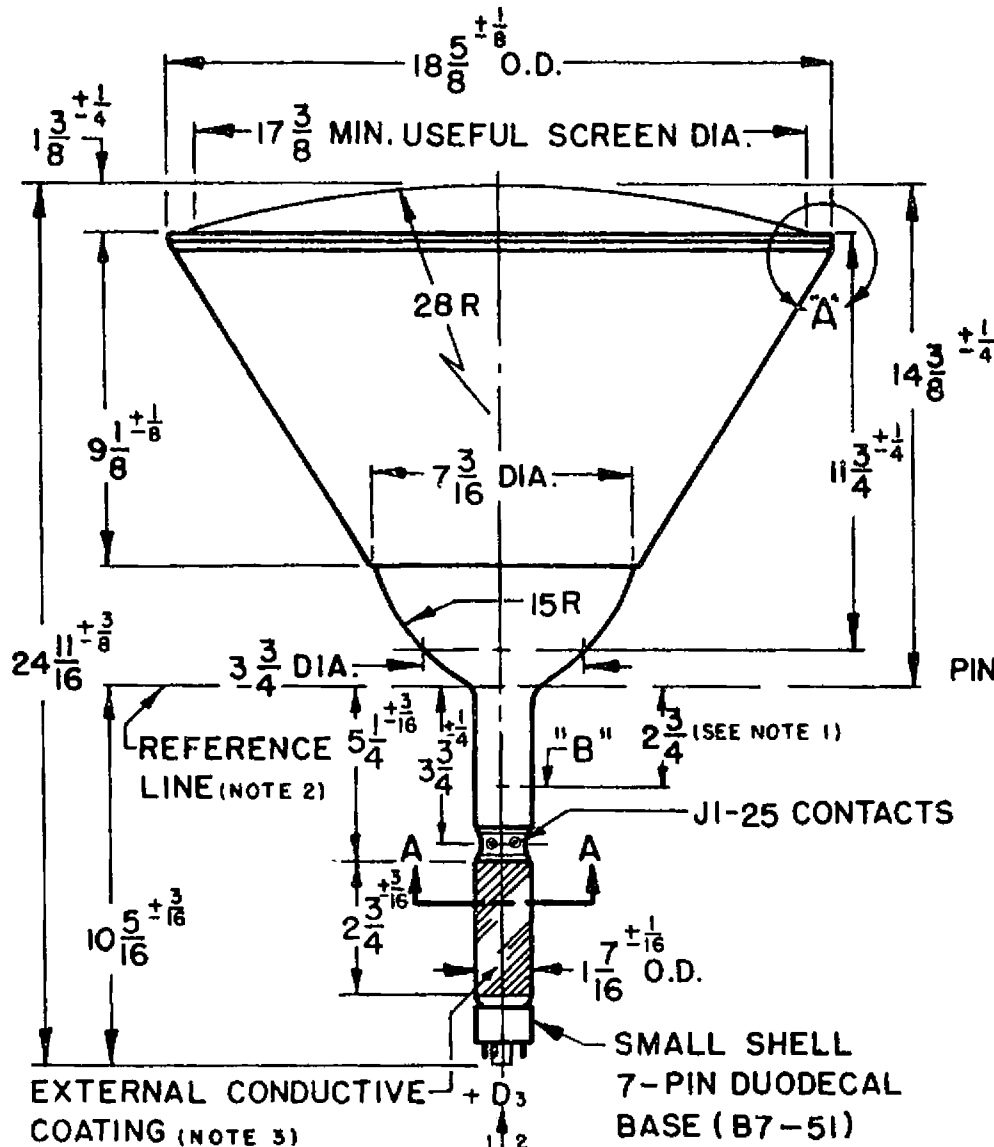
1. The electrostatic deflection plates are designed to form a 1/2-inch square raster which can be deflected to any portion of the screen by the magnetic deflection yoke. Other size rasters may be used with a decrease in magnetic deflection area for the larger ones.
2. The No. 12 and No. 19 screens can be permanently damaged if the current density is permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
3. The maximum O.D. of the neck, including deflection plate connections, is 1.500 inches.
4. For any value of beam current.
5. Visual extinction of undeflected, focused spot.
6. Measured in accordance with MIL-E-1 specifications for an  $I_b = 2 \mu A$ .
7. With deflecting electrodes connected to accelerator, the spot will fall within a 25-mm square centered on the face.
8. Measured in accordance with MIL-E-1 specifications, using a 50-line raster having a length of 3 inches on the high-frequency axis and a beam current of  $2 \mu A$ .
9. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

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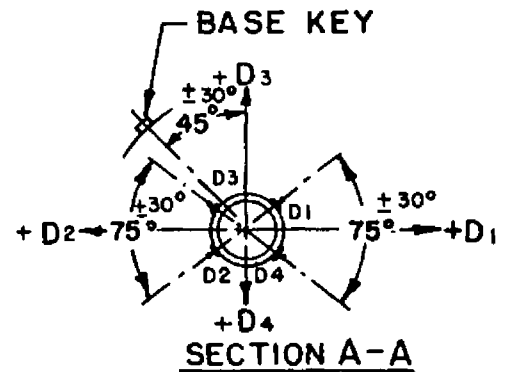
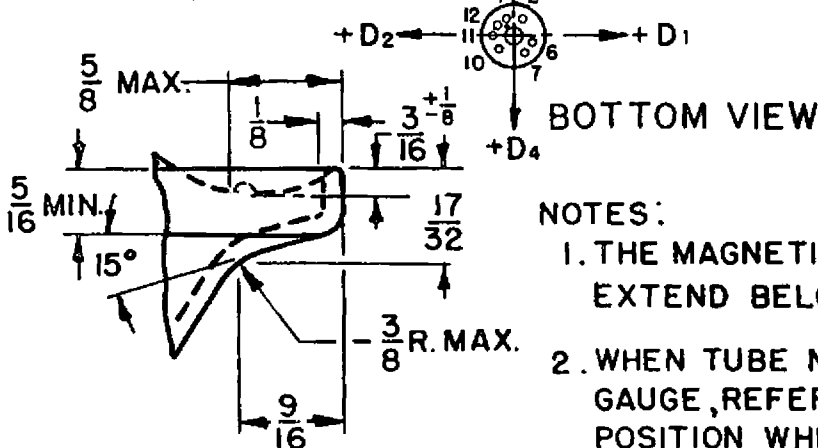
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## CATHODE - RAY TUBE

### 19WP -



PIN NO.	ELEMENT
1	HEATER
2	GRID NO.1
6	FOCUSING ELECTRODE
10	GRID NO.2
11	CATHODE
12	HEATER
	METAL CONE LIP-ACCELERATOR



**NOTES:**

1. THE MAGNETIC DEFLECTION FIELD SHOULD NOT EXTEND BELOW LINE "B"
2. WHEN TUBE NECK IS INSERTED THROUGH JEDEC G-112 GAUGE, REFERENCE LINE WILL BE DETERMINED BY POSITION WHERE GAUGE WILL REST ON FUNNEL
3. EXTERNAL CONDUCTIVE COATING MUST BE CONNECTED TO METAL CONE.