



# ENGINEERING DATA

**RAYONIC**  
**3SP1**  
**3SP2**  
**3SP7**  
**3SP11**

## RAYONIC® 3SP1 CATHODE RAY TUBE

### GENERAL DATA

Focusing Method .....	Electrostatic
Deflecting Method .....	Electrostatic
Phosphor Number .....	P1
Fluorescent Color .....	Green
Phosphorescent Color .....	None
Persistence .....	Medium
Mounting Position .....	Any

### ELECTRICAL DATA

Heater Voltage .....	6.3 Volts
Heater Current .....	0.6 ± 10% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to all other electrodes .....	5.6 μf
Grid #1 to all other electrodes .....	8.3 μf
D1 to D2 .....	7.2 μf
D3 to D4 .....	5.7 μf
D1 to all other electrodes .....	9.3 μf
D2 to all other electrodes .....	8.2 μf
D3 to all other electrodes .....	7.3 μf
D4 to all other electrodes .....	7.8 μf

### MECHANICAL DATA

Overall Length ..... 9 1/8 ± 1/4 Inches

Bulb Dimensions	Greatest Dim.	Min. Useful Screen	
Diagonal	3 11/32 ± 1/32	3	Inches
Width	3 ± 3/64	2 3/4	Inches
Height	1 15/32 ± 3/64	1 1/8	Inches

Bulb Number ..... ASA ..... J25 3/4 G12  
 Base-Small Shell Duodecal ..... JETEC ..... B12-43  
 Basing ..... JETEC ..... 12E

Base Alignment  
 D1D2 trace aligns with keyway and tube axis 0 ± 10 Degrees  
 Positive voltage on D1 deflects beam approximately toward keyway  
 Positive voltage on D3 deflects beam approximately toward pin #4  
 Angle between D3D4 and D1D2 traces; 90 ± 1 Degrees

Trace Alignment  
 Angle between trace and bulb wall ± 1 1/2 Degrees

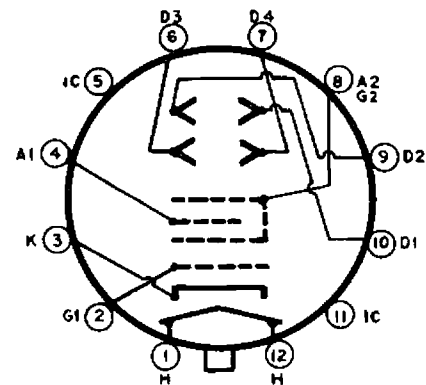
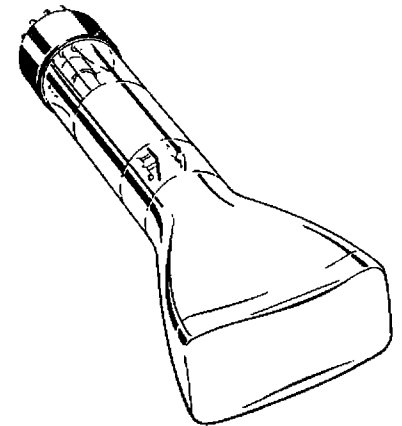
Deflection Plates  
 D1-D2 are nearest to the screen (3" Dimension)  
 D3-D4 are nearest to the base (1 1/2" Dimension)

### MAXIMUM RATINGS (Design Center Values)

Anode Voltage (A2) .....	2750 Volts DC
Anode (A2) Input .....	6 Watts
Anode #1 (Focusing Electrode) Voltage .....	1100 Volts
Grid #1 (G1) Voltage	
Negative-Bias Value .....	200 Volts DC
Positive-Bias Value .....	0 Volts DC
Positive-Peak Value .....	2 Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	
during warm-up (max. 15 seconds) .....	410 Volts
after equipment warm-up .....	125 Volts
Heater positive with respect to cathode .....	125 Volts
Peak Voltage between Anode #2 and any deflecting plate .....	550 Volts

### QUICK REFERENCE DATA

OSCILLOSCOPE TUBE  
 FACE—1 1/2" x 3"  
 DEFLECTION SENSITIVITY—GOOD  
 LENGTH—SHORT  
 MONOACCELERATOR  
 FACE PLATE—CLEAR, CYLINDRICAL  
 FOCUSING—ELECTROSTATIC  
 DEFLECTION—ELECTROSTATIC  
 JAN APPROVED



12 E

3SP1

## TUBE RATINGS

Focusing Electrode (A1) Current for any operating condition .....	- 15 to +10 $\mu$ Amps
Spot Position (undeflected) (NOTE 1) .....	12 Max. mm
Useful Scan	
D1D2 .....	2 $\frac{3}{4}$ Inches
D3D4 .....	1 $\frac{1}{8}$ Inches
A1 Voltage 16.5% to 31% of A2 Voltage	
G1 Voltage 2.8% to 6.7% of A2 Voltage (NOTE 2)	
Deflection Factors	
D1 and D2 (3" Dimension) .....	73 to 99 Volts DC/inch/A2 Kilovolt
D3 and D4 (1 $\frac{1}{2}$ " Dimension) .....	52 to 70 Volts DC/inch/A2 Kilovolt

## OPERATING CONDITIONS

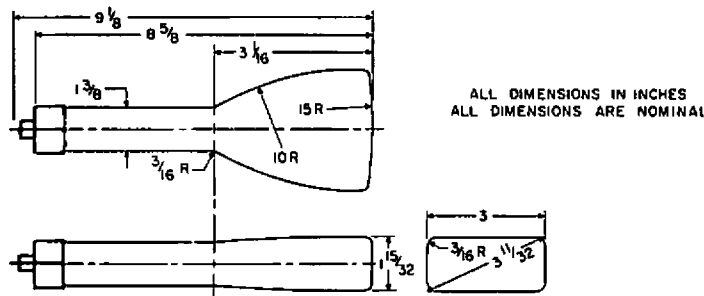
	Minimum	Typical	Typical	
Anode Voltage (A2)	500	1000	2000	Volts
Focusing Electrode Voltage (A1)	82.5 to 155	165 to 310	330 to 620	Volts
Grid #1 Voltage (Note 2)	-14.5 to -33.75	-29 to -67.5	-58 to -135	Volts
Deflection Factor D1-D2	36.5 to 49.5	73 to 99	146 to 198	Volts DC/Inch
Deflection Factor D3-D4	26 to 35	52 to 70	104 to 140	Volts DC/Inch

## MAXIMUM CIRCUIT VALUES

Grid #1 Circuit Resistance .....	1.5 Megohms
Resistance in any Deflecting Electrode Circuit (Note 3) .....	1.0 Megohms

## NOTES

1. With deflecting electrodes connected to Anode (A2).
2. For visual extinction of undeflected focused spot.
3. The resistance in each deflecting electrode circuit should be approximately equal.



## 3SP2

The Waterman Rayonic Type 3SP2 is identical to the Type 3SP1 except that it has a green fluorescent, green phosphorescent, long persistence phosphor.

## 3SP7

The Waterman Rayonic Type 3SP7 is identical to the Type 3SP1 except that it has a blue fluorescent, yellow phosphorescent, long persistence phosphor. Use of 3SP7 at anode voltage below 1000 volts is not recommended.

## 3SP11

The Waterman Rayonic Type 3SP11 is identical to the Type 3SP1 except that it has a blue fluorescent, short persistence phosphor.

## WATERMAN PRODUCTS CO., INC.

Phone: GARfield 6-8600 Philadelphia 25, Penna., USA Cable Address, Poketscope, Phila.

Manufacturers of POCKETSCOPE®, CRAFTSCOPE®, PULSESCOPE®, PANELSCOPE®,  
PANELPACK®, RAKSCOPE®, SYSTEMAT®, RAYONIC® TUBES

