from JEDEC release #3011, Oct. 31, 1960

WATERMAN PRODUCTS

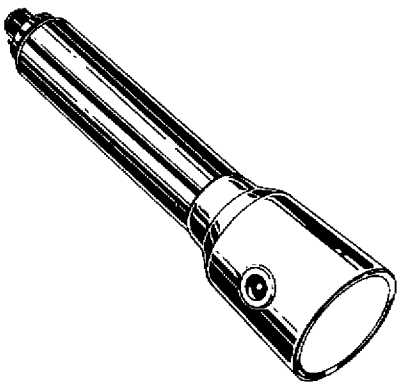
ENGINEERING DATA

RAYONIC
2FP1
2FP2
2FP4
2FP7
2FP11

RAYONIC® 2FP1 CATHODE RAY TUBE

QUICK REFERENCE DATA

OSCILLOSCOPE AND MONITOR TUBE
FLAT FACE—2" ROUND
SHIELD—INTEGRAL MAGNETIC & MOUNTING
LENGTH—SHORT
DEFLECTION SENSITIVITY—EXCELLENT
MONOACCELERATOR
DEFLECTION—ELECTROSTATIC
FOCUSING—ELECTROSTATIC



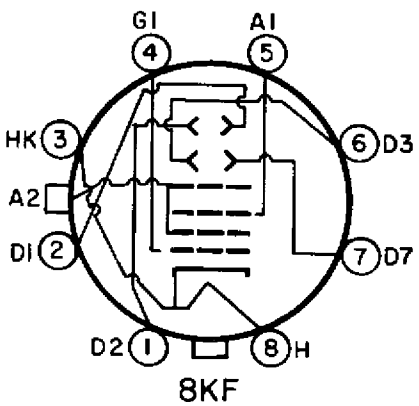
GENERAL DATA

Focusing Method	Electrostatic
Deflecting Method	Electrostatic
Phosphor	P1
Fluorescent Color	Green
Phosphorescent Color	None
Persistence	Medium
Mounting position	Any
Shield	Magnetic and mounting shield over the neck

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Amperes
Direct Interelectrode Capacitances (approx)*	
Grid #1 to all other electrodes	4.5 μμf
D1 to D2	2.0 μμf
D3 to D4	2.5 μμf
D1 to all other electrodes	6.5 μμf
D2 to all other electrodes	6.0 μμf
D3 to all other electrodes	5.5 μμf
D4 to all other electrodes	5.5 μμf

*Magnetic Shield grounded



MECHANICAL DATA

Overall Length	7⅝ ± 3/16
Greatest Bulb Diameter	2 1/16
Minimum Useful Screen Diameter	1¾"
Bulb Number	WPC APZ180
Base Neo-eightar	JEDEC B8-218
Basing	JEDEC 8 KF
Base Alignment	
D1 D2 trace aligns with Pin #3 and tube axis; 0 ±10 deg.	
Positive voltage on D1 deflects beam approx. toward pin #3	
Positive voltage on D3 deflects beam approx. toward pin #5	
Trace Alignment	
Angle between D3 D4 and D1 D2 traces; 90 ±1 degree	
Anode Contact	JEDEC J1-21
Anode Contact is on same side as Pin #3	
Deflection Plates	
D1-D2 are nearest to the screen	
D3-D4 are nearest to the base	

MAXIMUM RATINGS (Design Center Value)

Anode Voltage (A2)	3000 Volts DC
Anode (A2) Input	6 watts
Anode #1 (Focusing Electrode) Voltage	1200 Volts
Grid #1 (G1) Voltage	
Negative bias value	140 Volts DC
Positive bias value	0 Volts DC
Positive peak value	2 Volts
Peak Voltage between Anode #2 and any deflecting plate	550 Volts
Altitude	35,000 feet

2FP1□

TUBE RATINGS

Focusing Electrode (A1) Current for any operating condition ..... −15 to ±10 μ Amp
Spot Position, undeflected (note 1) ..... 10 Max. mm
A1 Voltage 20% to 35% of A2 Voltage
G1 Voltage 3.5 max % of A2 Voltage
Deflection factors
D1 D2 ..... 51 to 69 Volts DC/inch/A2 Kilovolts
D3 D4 ..... 29 to 39 Volts DC/inch/A2 Kilovolts

OPERATING CONDITIONS

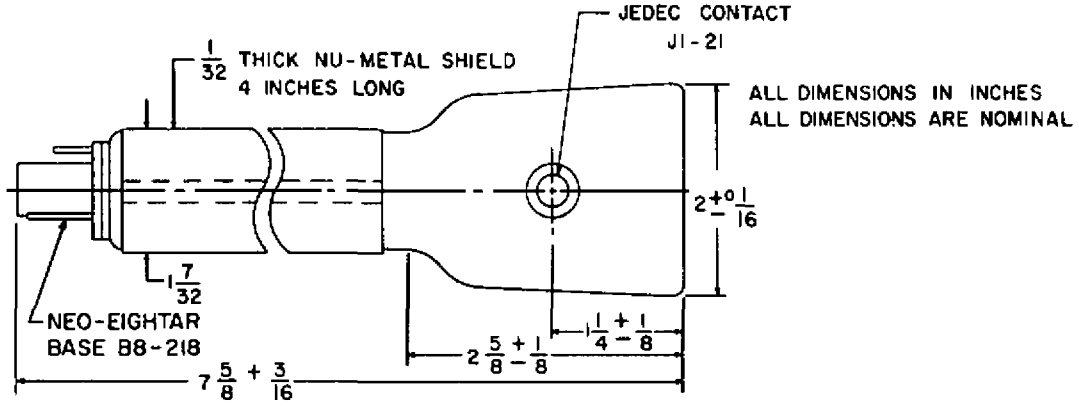
	Minimum	Typical	Typical	
Anode Voltage (A2)	1000	1500	2000	Volts
Focusing Elec. Volt. (A1)	200 to 350	300 to 525	400 to 700	Volts
G1 Voltage (Note 2)	−20 to −35	−30 to −52	−40 to −70	Volts
Deflection Factor D1-D2	51 to 69	76 to 103	102 to ~~118~~ 138	Volts DC/in
Deflection Factor D3-D4	29 to 39	44 to 59	58 to 78	Volts DC/in

MAXIMUM CIRCUIT VALUES

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

NOTES

1. *With tube shielded and 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.*



2FP2

The Rayonic Type 2FP2 is identical to the type 2FP1, except that it has a green fluorescent, green phosphorescent, long persistence phosphor.

2FP4

The Rayonic type 2FP4 is identical to the type 2FP1, except that it has a white fluorescent, medium persistence phosphor.

2FP7

The Rayonic type 2FP7 is identical to the type 2FP1, except that it has a blue fluorescent, yellow phosphorescent, long persistence phosphor.

2FP11

The Rayonic type 2FP11 is identical to the type 2FP1, except that it has a blue fluorescent short persistence phosphor.

WATERMAN PRODUCTS CO., INC.

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

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