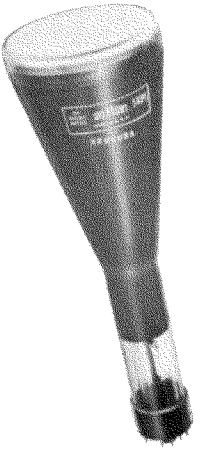
5AQP- CATHODE-RAY TUBES

The new Du Mont Type 5AQP- is a flat-faced, tight-tolerance mono-accelerator cathode-ray tube employing electrostatic focus and deflection. Scanning is limited in both axes to 4 inches to afford high deflection sensitivities. This simplifies the output requirements of low- and medium-frequency deflection amplifiers for which these tubes are intended.



The mono-accelerator principle requires that all beam acceleration occur *before* the beam enters the deflection system and consequently, field distortion effects on the beam are virtually eliminated. This results in excellent deflection linearity.

Since the Type 5AQP- is intended for low- and medium-frequency applications, all electrode leads are wired through the tube base to simplify the mechanical design of the equipment in which the tube is used. For high-frequency tubes, see Types 5AMP- and 5ATP-.

GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	2.7	5.0	μμf.
Grid No. 1 to all other electrodes	3.7	6.9	μμf.
D1 to D2	2.4	4.5	μμf.
D3 to D4	.8	1.6	μμf.
D1 to all other electrodes	5.0	9.3	μμf.
D2 to all other electrodes	5.0	9.3	μμf.
D3 to all other electrodes	3.3	6.3	μμf.
D4 to all other electrodes	3.3	6.3	μμf.

Mechanical Data

Overall Length	16¾ ± 3/16 Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4½ Inches
Base (Medium Shell Diheptal 12-pin)	B12-37
Basing	14G

Base Alignment

D1D2 trace aligns with Pin No. 5 and Tube Axis ± 10 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 ± 1 Degrees

MAXIMUM RATINGS (Design Center Values)

Accelerator Voltage[1]	4,000 Max. Volts D-C
Focusing Voltage	1,500 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to Cathode	180 Max. Volts D-C
Heater Positive with respect to Cathode	180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode	1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Accelerator Voltage of	2,500 Volts D-C
Focusing Voltage	0 to 300 Volts D-C
Grid No. 1 Voltage[2]	—34 to —56 Volts D-C
P1 Light Output[3]	15 Ft. L. Min.
Modulation[3]	40 Max. Volts D-C
Line Width A[3]	.030 Inches Max.
Accelerator Current[3]	400 Max. Microamperes D-C
Deflection Factors:	
D1 and D2	40 to 50 Volts D-C per Inch
D3 and D4	31.5 to 38.5 Volts D-C per Inch
Deflection Factor Uniformity[4]	1% Maximum
Useful Scan	
D1D2	4 Inches*
D3D4	4 Inches*
Pattern Distortion @ 90% of useful scan[5]	2% Maximum
Spot Position	Within a 5/16-inch radius circle[7]

CIRCUIT DESIGN VALUES

Focusing Current for any operating condition	—15 to +15 Microamperes D-C
Grid No. 1 Voltage[2]	13.6 to 22.4 Volts D-C per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit[8]	1 Max. Megohm
Deflection Factors	
D1 and D2	16 to 20 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4	12.6 to 15.4 Volts D-C/Inch/KV of Accelerator Voltage

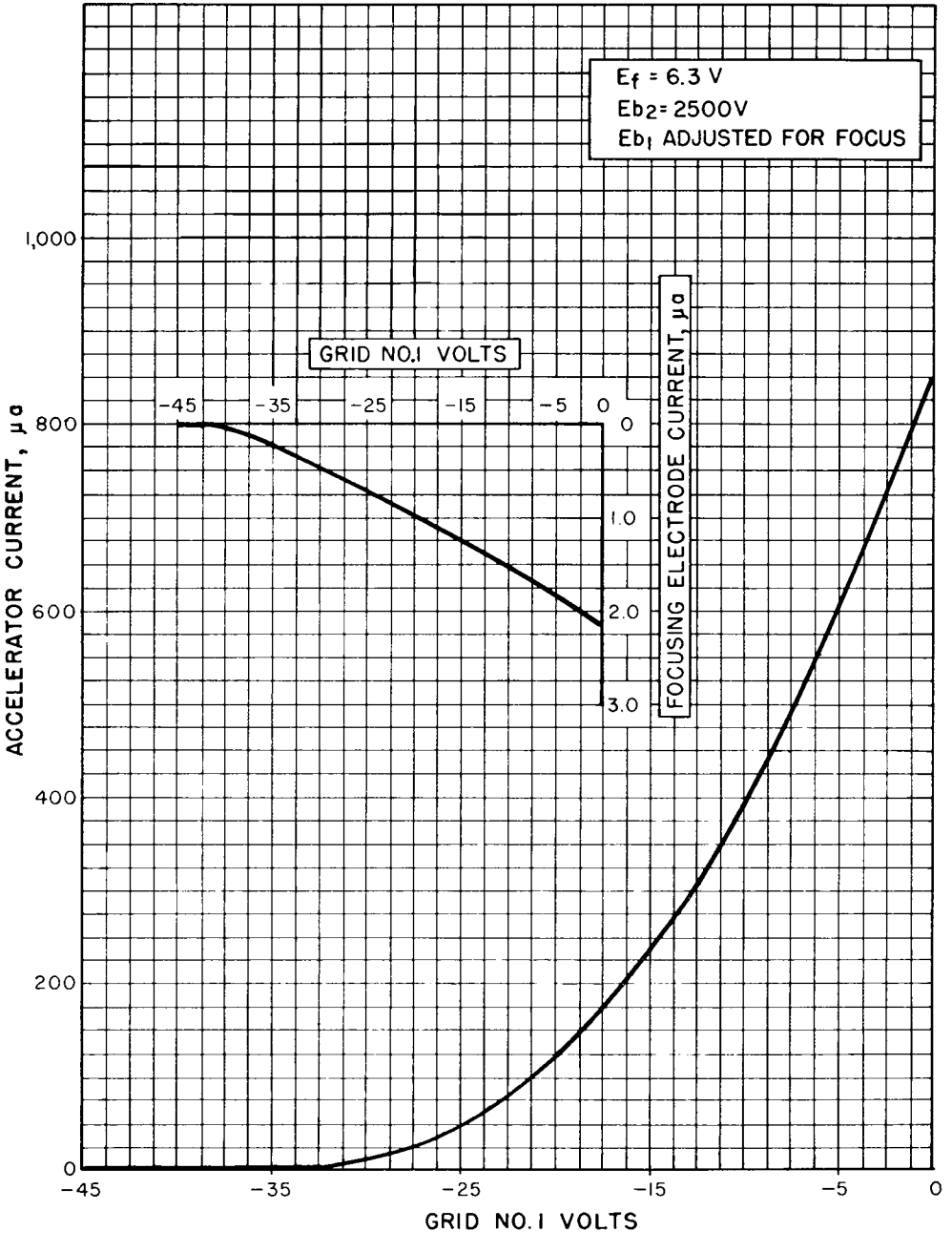
* ± 2″ minimum from tube face center

NOTES

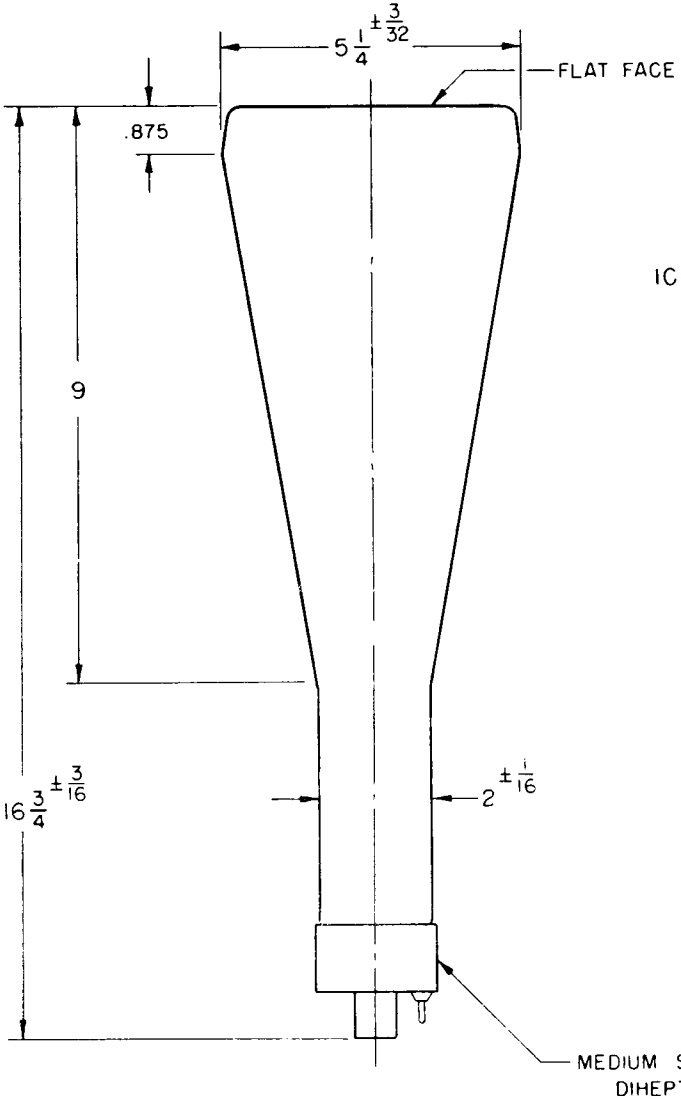
1. The product of Accelerator Voltage and average Accelerator Current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with MIL-E-1 Specifications.
4. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
5. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 3.672-inch square, will fall within the area bounded by the 3.672-inch square and an inscribed 3.528-inch square.
6. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated, the accuracy will improve.
7. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb2 = 2500 V., Eb1 at focus); Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.
   Under stable operating conditions, the position of the spot will not shift with changes in intensity by more than .025 inch.
8. It is recommended that the deflecting electrode circuit resistances be approximately equal.
9. An adjustable D.C. potential between the accelerator and the deflection plates may be used to secure best overall focus.

TYPE 5AQP-

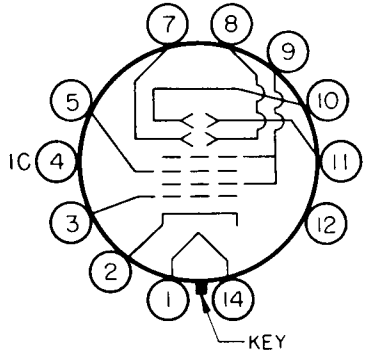
AVERAGE CHARACTERISTICS



TYPE 5AQP-



14G



BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ACCELERATOR
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER