

TENTATIVE DATA

QUICK REFERENCE DATA

56cm (22in) rectangular shadow-mask colour television tube incorporating three guns and a metal-backed three-colour phosphor dot screen.

Advanced red phosphor, europium activated.

Increased white brightness.

Unity current ratio for white point $x = 0.281$, $y = 0.311$

Temperature compensated shadow-mask maintains purity during warm-up. Shadow-mask optimised for minimum moiré effect on 625 line system.

Reinforced tube envelope-separate safety screen not required.

Deflection angle	92	deg
Focusing	Electrostatic	
Light transmission (approx.)	53	%
Maximum overall length	482	mm

This data should be read in conjunction with GENERAL OPERATIONAL RECOMMENDATIONS - TELEVISION PICTURE TUBES

HEATER

V_h (see note 1)	6.3	V
I_h	900	mA

The limits of heater voltage and current are contained in General Operational Recommendations - Television Picture Tube.

OPERATING CONDITIONS (each gun)

V_{a3+a4}	25	kV
V_{a2} (focus electrode control range)	4.2 to 5.0	kV
V_{a1} (at $V_g = -100V$ for visual extinction of focused raster)	210 to 495	V
V_g (at $V_{a1} = 300V$ for visual extinction of focused raster)	-65 to -135	V

*Light output at screen centre

(at $I_{a3+a4} = 800\mu A$)	120	cd/m ² (nits)
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*To produce white of colour co-ordinates

$x = 0.281$, $y = 0.311$ with a focused raster size of $447 \times 337mm$.

SCREEN

Metal backed

Phosphor types for separate fluorescent colours:

Red	Europium activated rare earth
Green	Sulphide
Blue	Sulphide

Useful screen area See page 7

Spacing between centres of adjacent phosphor dot triads (approx.) 0.68 mm

Light transmission (approx.) 53 %

FOCUSING

Electrostatic

DEFLECTION

Magnetic

Diagonal deflection angle 92 deg

Horizontal deflection angle 79 deg

Vertical deflection angle 61 deg

CONVERGENCE

Magnetic

CAPACITANCES (approx.)

c_{g-all} (each gun)	7.0	pF
$c_{(kR+kG+kB) - all}$	15	pF
$c_{kR - all}$	5.0	pF
$c_{kG - all}$	5.0	pF
$c_{kB - all}$	5.0	pF
c_{a2-all}	7.0	pF
$c_{a3+a4-M}$	1700 to 2300	pF
$c_{a3+a4-B}$	400	pF

EXTERNAL CONDUCTIVE COATING

This tube has an external conductive coating, M, which must be connected to chassis, and the capacitance of this coating to the final anode is used to provide smoothing for the e.h.t. supply. The electrical connection to this coating must be made within the area specified on the tube outline drawing.

REFERENCE LINE GAUGE

See page 10

MOUNTING POSITION

Any. The tube socket should not be rigidly mounted but should have flexible leads and be allowed to move freely. The bottom circumference of the base shell will fall within a circle of 55mm diameter which is centred upon the perpendicular from the centre of the face.

MAGNETIC SHIELDING

Magnetic shielding must be provided to minimise the effects of extraneous magnetic fields, including the earth's magnetic field. This shielding, in the form of a metal shell extending 250mm over the cone of the tube measured from the centre of the screen, should be constructed of cold-rolled mild steel of 0.5mm minimum thickness. The magnetic shield should be connected to the outer conductive coating. See page 10 for physical dimensions.

RATINGS (DESIGN CENTRE SYSTEM)

V_{a3+a4} max. (absolute rating) (see notes 2 and 3)	27.5	kV
V_{a3+a4} min. (absolute rating) (see note 4)	20	kV
I_{a3+a4} (long term average max. for three guns: see note 5)	1.0	mA
V_{a2} max. (see note 3)	6.0	kV
$v_{a1(pk)}$ max.	1.0	kV
$-V_g$ max.	400	V
V_g max.	0	V
V_{h-k} max. (see note 6)		
Cathode positive		
d.c. max.	250	V
pk max.	300	V
Cathode negative		
d.c. max.	135	V
pk max.	180	V
R_{g-k} max.	750	kΩ

EQUIPMENT DESIGN VALUES (each gun if applicable)

Valid for $V_{a3+a4} = 20$ to 27.5 kV V_{a2} 16.8 to 20% of V_{a3+a4} V_{a1} see page 14 V_g see page 14

Variation in cut-off voltage between guns Minimum value is at least 65% of the maximum value.

 I_{a2} -15 to +15 μA I_{a1} -5 to +5 μA I_g at $V_g = -150\text{ V}$ -5 to +5 μA

To produce white of colour	x	0.310	0.265	0.281
co-ordinates:	y	0.316	0.290	0.311

Percentage of total anode current supplied by each gun (typical)

Red gun 43.5 27.9 32.2 %

Green gun 30.0 34.9 35.6 %

Blue gun 26.5 37.2 32.2 %

Ratio of cathode currents

Red gun to green gun min. 1.05 0.60 0.65

av. 1.45 0.80 0.90

max. 2.00 1.10 1.25

Red gun to blue gun min. 1.20 0.55 0.75

av. 1.65 0.75 1.00

max. 2.25 1.05 1.35

Maximum electron beam shift required from purity magnets ± 0.115 mmMaximum required raster shift ± 13 mmMaximum lateral convergence shift of blue beam with respect to the converged red and green beams ± 6 mmMaximum radial convergence shift, excluding effects of dynamic convergence (each beam) ± 9 mm

WEIGHT

Tube alone (approx.) 15 kg



NOTES

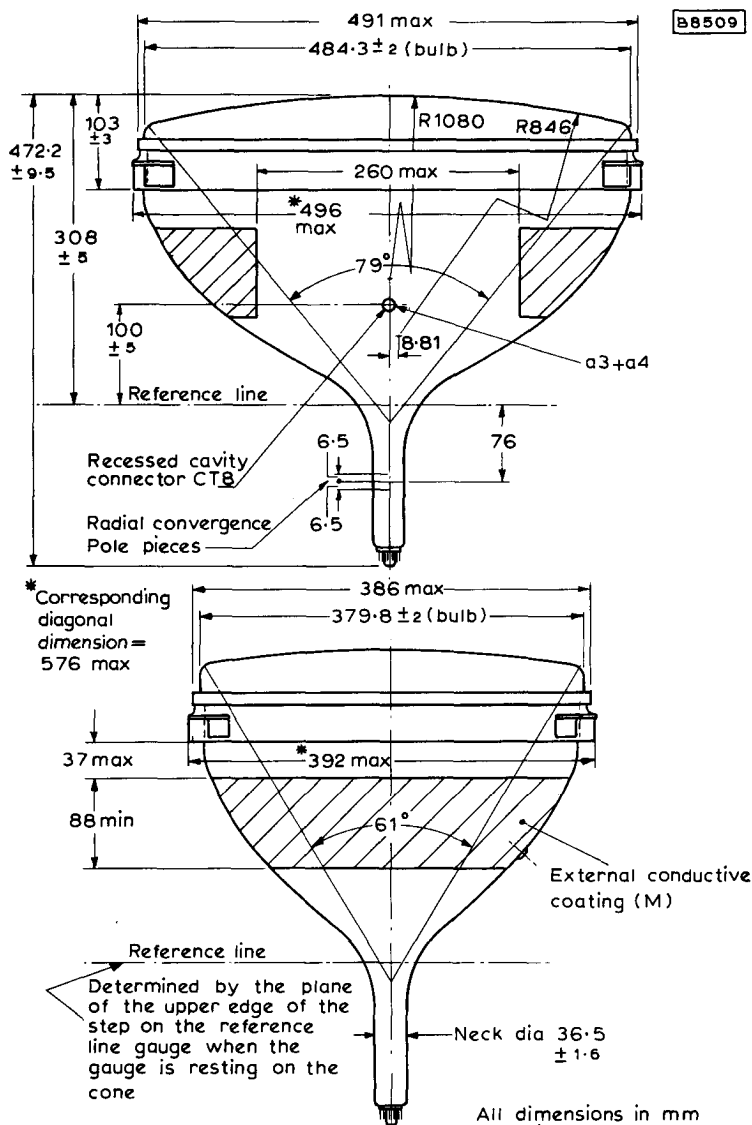
1. For maximum cathode life, it is recommended that the heater supply be regulated at 6.3V.
2. The tube does not emit X-radiation above the internationally accepted maximum dosage rate if it is operated from an e.h.t. source supplying an absolute maximum voltage of 27.5kV at zero beam current and with an internal impedance $\geq 500k\Omega$.
3. Adequate precautions should be taken to ensure that the receiver is protected from damage which may be caused by a possible high voltage flashover within the cathode ray tube. In view of the high voltage on a2, adequate precautions should be taken to ensure freedom from flashover on all connections to this electrode.
4. Operation at lower voltages impairs brightness and resolution and may have a detrimental effect on colour purity.
5. The limiting value "long term average maximum current" of 1.0mA will be met provided a device is incorporated in the circuit to limit the short term average current to 1.5mA.
6. In order to avoid excessive hum the a.c. component of V_{h-k} should be as low as possible ($\leq 20V_{r.m.s.}$)

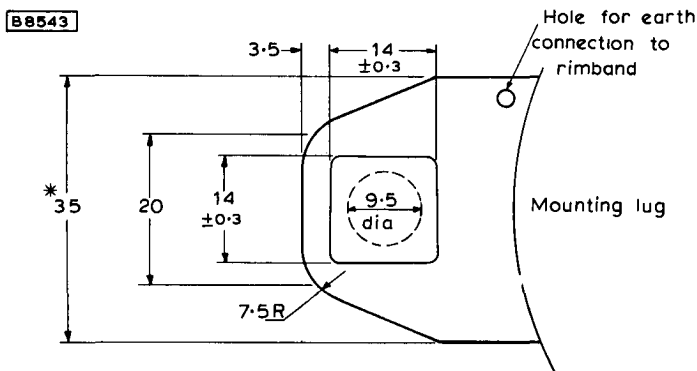
During an equipment warm-up period not exceeding 15 seconds $v_{h-k(pk)}$ max. (cathode positive) is allowed to rise to 410V. Between 15 and 45 seconds after switching on a decrease in $v_{h-k(pk)}$ max. (cathode positive) proportional with time from 410 to 250V is permissible.

7. The metal band (B) should be connected directly to the chassis in an a.c. receiver operating from an isolating transformer, or via a suitable leakage path in an a.c./d.c. receiver.
8. The dynamic convergence to be effected by currents of approximately parabolic waveshape synchronised with scanning.

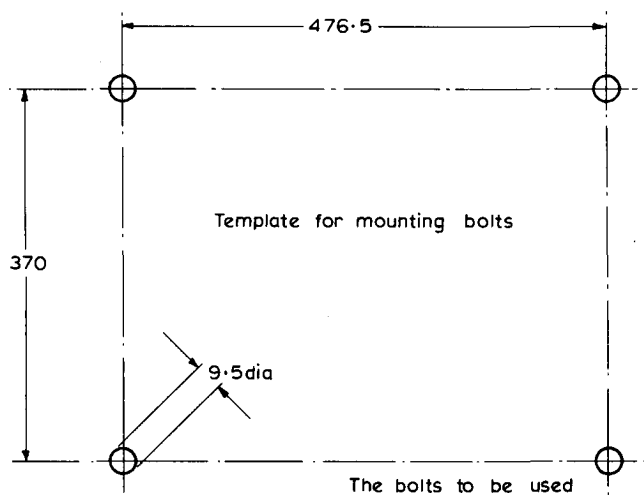
OUTLINE DRAWING

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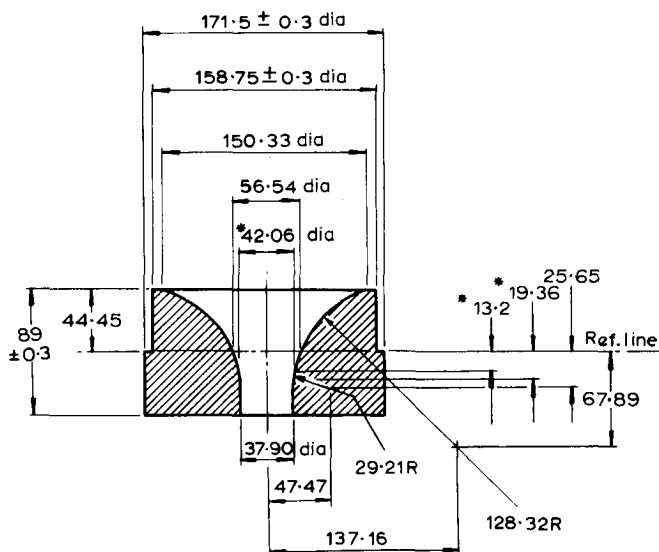


* Minimum space to be reserved for mounting lugs = 40 mm



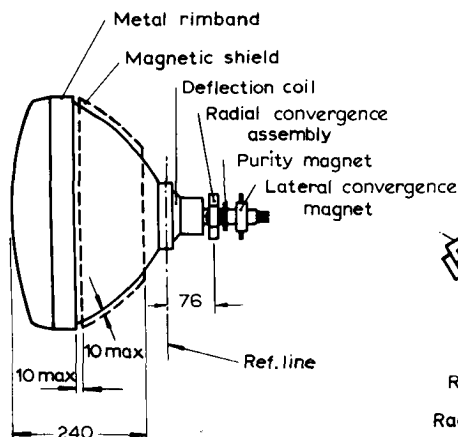
The bolts to be used for mounting the tube must be within the circles of 9.5mm diameter shown in the template drawing.

All dimensions in mm

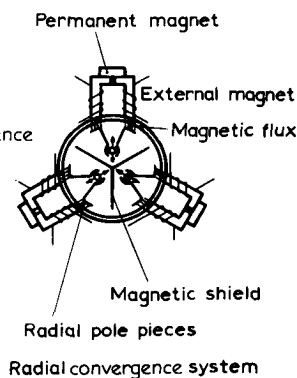


Reference line gauge

* These dimensions define extent of 29.21R

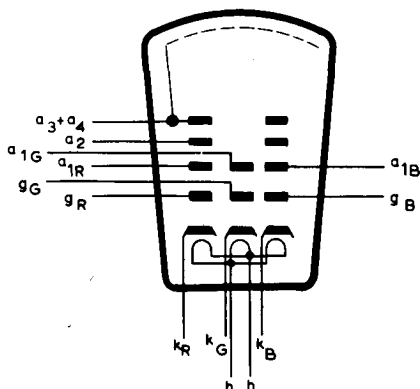
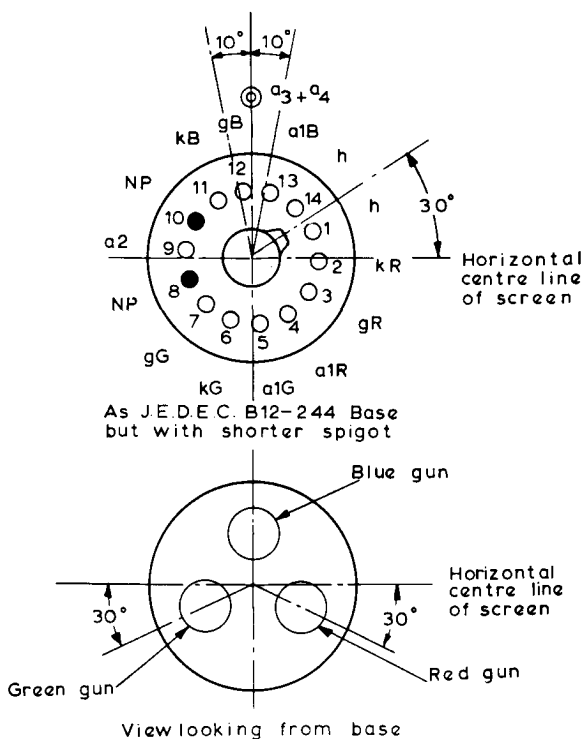


Outline of tube with components

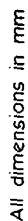


All dimensions in mm

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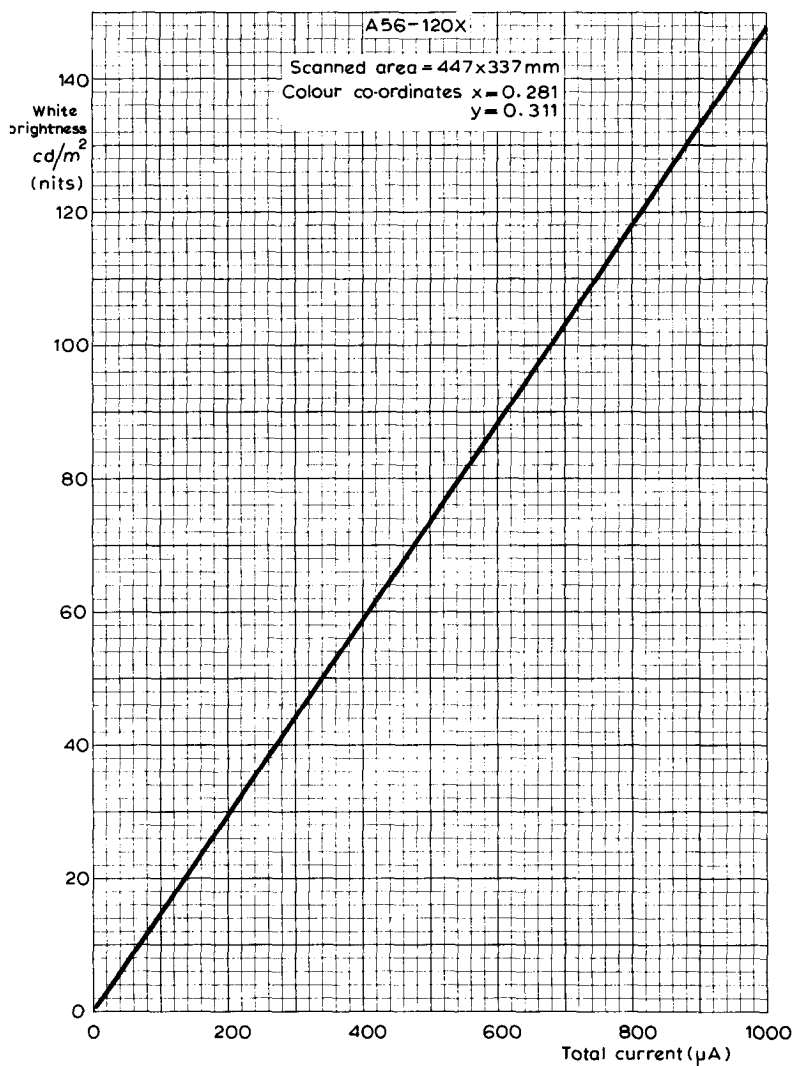


DIMENSIONS FOR MAXIMUM CONE CONTOUR DRAWING (Page 12)

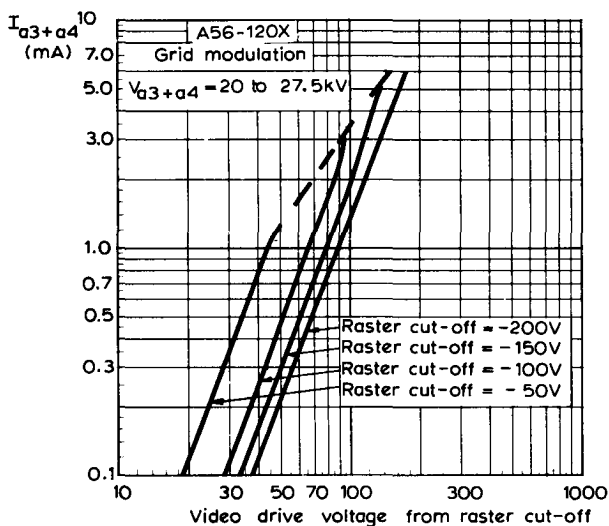
Section	Nominal distance from point 'Z'	Long axis	Distance from centre (max. values)												Short axis	90°		
			0°	10°	20°	25°	30°	33°30'	35°30'	37°	39°	42°	45°	50°			60°	70°
1	227.2	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9
2	222.6	87.7	87.7	87.6	87.6	87.5	87.5	87.5	87.4	87.4	87.4	87.4	87.3	87.2	87.2	87.1	87.1	87.1
3	214.6	103.3	103.0	102.1	101.6	101.0	100.6	100.4	100.2	100.0	99.6	99.3	98.9	98.1	97.5	97.4	97.3	97.3
4	206.6	118.0	117.5	116.0	115.1	114.1	113.3	112.9	112.6	112.2	111.6	101.0	110.0	108.3	107.1	106.4	106.2	106.2
5	198.6	131.0	130.5	129.0	127.9	126.6	125.7	125.1	124.7	124.1	123.2	122.4	120.9	118.3	116.2	114.9	114.4	114.4
6	190.6	142.7	142.4	141.1	140.1	138.8	137.7	137.0	136.5	135.8	134.7	133.5	131.6	127.9	124.8	122.8	122.1	122.1
7	182.6	153.3	153.3	152.6	151.7	150.5	149.3	148.6	148.0	147.2	145.8	144.4	142.0	137.1	132.9	130.1	129.2	129.2
8	174.6	163.0	163.4	163.4	162.9	161.8	160.7	159.9	159.3	158.3	156.8	155.0	152.0	145.8	140.5	137.0	135.8	135.8
9	166.6	172.1	172.8	173.7	173.6	172.8	171.7	170.9	170.2	169.2	167.4	165.4	161.6	154.0	147.6	143.4	141.9	141.9
10	158.6	180.6	181.6	183.5	183.9	183.5	182.5	181.7	180.9	179.8	177.7	175.3	170.9	161.7	154.2	149.4	147.7	147.7
11	150.6	188.6	190.0	192.7	193.7	193.8	193.0	192.2	191.4	190.1	187.8	185.0	179.7	169.0	160.3	154.9	153.1	153.1
12	142.6	196.2	197.8	201.6	203.2	203.8	203.3	202.5	201.6	200.2	197.5	194.3	188.1	175.8	166.0	160.1	158.1	158.1
13	134.6	203.3	205.3	209.9	212.2	213.5	213.3	212.5	211.6	210.1	206.9	203.1	196.1	182.1	171.4	164.9	162.8	162.8
14	126.6	210.1	212.3	217.8	220.8	222.9	223.1	222.3	221.4	219.7	216.0	211.6	203.5	187.9	176.3	169.4	167.2	167.2
15	118.6	216.4	218.9	225.3	229.0	231.9	232.6	231.9	231.0	229.0	224.7	219.6	210.4	193.2	180.8	173.6	171.2	171.2
16	110.6	222.5	225.1	232.3	236.8	240.6	241.9	241.4	240.3	238.1	233.0	227.1	216.7	198.1	184.3	177.4	175.0	175.0
17	102.6	228.2	231.0	239.0	244.2	249.0	251.0	250.6	249.4	247.0	241.0	234.1	222.5	202.5	188.3	181.0	178.5	178.5
18	94.6	233.4	236.3	245.0	250.9	256.9	259.9	259.6	258.4	255.6	248.5	240.6	227.8	206.4	192.2	184.3	181.7	181.7
19	86.6	237.4	240.5	249.7	256.5	264.0	268.3	268.4	267.3	264.2	255.7	246.6	232.3	209.9	195.3	187.2	184.6	184.6
20	78.6	240.3	243.5	253.2	260.7	269.8	276.1	276.9	275.9	272.6	262.4	251.7	236.1	212.8	199.1	189.9	187.3	187.3
21	70.6	242.3	245.5	255.4	263.3	273.2	280.6	281.8	281.0	277.6	266.4	254.9	238.6	214.9	200.1	191.9	189.3	189.3
22	62.6	243.4	246.6	256.6	264.5	274.7	282.4	283.7	283.0	279.5	268.2	256.4	240.0	216.2	201.3	193.1	190.4	190.4
23	57.35	243.9	247.1	257.1	265.0	275.2	282.8	284.2	283.4	280.0	268.7	257.0	240.5	216.7	201.8	193.5	190.9	190.9

All dimensions in mm

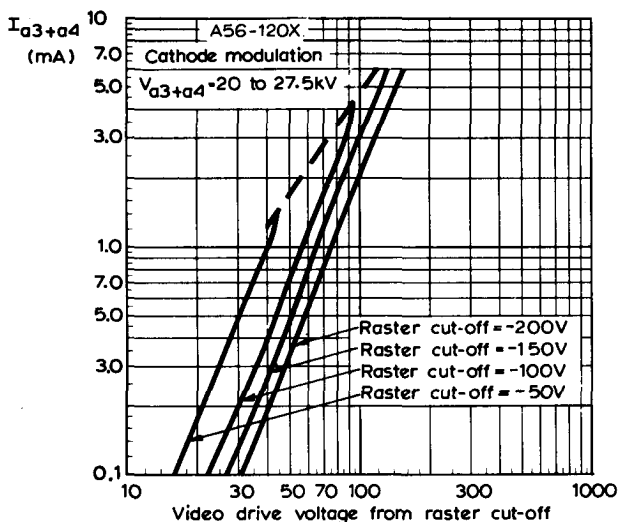




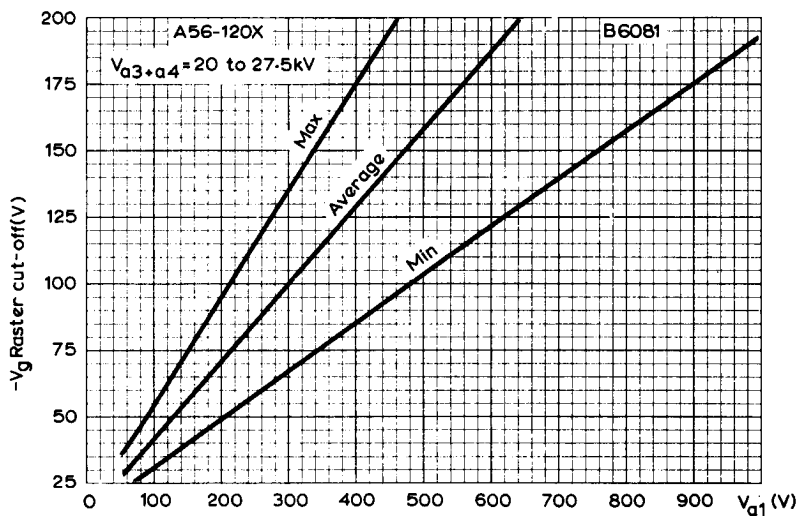
BRIGHTNESS AT CENTRE OF SCREEN PLOTTED AGAINST TOTAL CURRENT
FOR WHITE OF COLOUR COORDINATES $x=0.281$, $y=0.311$



FINAL ANODE CURRENT PLOTTED AGAINST GRID VOLTAGE.
GRID MODULATION.



FINAL ANODE CURRENT PLOTTED AGAINST CATHODE-TO-GRID
VOLTAGE. CATHODE MODULATION



CUT-OFF DESIGN CHART