



## PROCESS SPECIFICATIONS

NO. 8-0546

REV. 07

DATE 3-6-72

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TEST SPECIFICATIONS FOR T5641-200 & 201, T5642-200 CATHODE  
RAY TUBE

WRITING GUN: All the given specifications refer to the following test  
voltages (measured with respect to writing gun cathode).

<u>Electrode Designation</u>	<u>Voltage</u>
Heater (WGH)	6.3 Vac
Grid No. 1 (WGG)	0 to -88 VDC <sup>9</sup>
Accelerator (WGA) <sup>1</sup>	3425 VDC
Blanking Plate Return (B1) <sup>1</sup>	3425 VDC
Blanking Plate (B2)	3425 VDC +88 volts <sup>2</sup>
Focusing Electrode	460 to 820 VDC <sup>3</sup>
Astigmatism Electrode (Astig.)	3300 to 3600 VDC <sup>3</sup>
Average of Deflection Plates	3480 VDC
Isolation Shield <sup>4</sup> (ISO)	3450 to 3550 VDC <sup>4</sup>
Flood Gun Cathodes (FGK)	3300 VDC
Flood Gun Accelerator (FGA) <sup>4</sup>	3450 to 3550 VDC <sup>4</sup>
Storage Target Backplate (STB)	3370 to 3580 VDC <sup>5</sup>

FLOOD GUN: (All measurements taken with respect to the flood gun cathode)

<u>Electrode Designation</u>	<u>Voltage</u>
Common Heaters - Flood Guns (FGH-Com)	12.6 VDC
Grid No. 1 - Flood Gun 'A' (FGG-A)	0 to -100 VDC <sup>6</sup>
Grid No. 1 - Flood Gun 'B' (FGG-B)	0 to -100 VDC <sup>6</sup>
Flood Gun Accelerator (FGA) <sup>4</sup>	150 to 250 VDC <sup>4</sup>
Collimation Electrode No. 1 (CE1) <sup>4</sup>	150 to 250 VDC <sup>4</sup>
Collimation Electrode No. 2 (CE2)	250 VDC
Collimation Electrode No. 3 (CE3)	125 to 240 VDC <sup>7</sup>
Collimation Electrode No. 4 (CE4)	70 to 125 VDC <sup>7</sup>
Collimation Electrode No. 5 (CE5)	10 to 75 VDC <sup>7</sup>
Locate Area	10 to 75 VDC <sup>8</sup>
Storage Target Backplate No. 1 (STB 1)	70 to 280 VDC <sup>5</sup>
Storage Target Backplate No. 2 (STB 2)	70 to 280 VDC <sup>5</sup>

## NOTES:

1. The accelerator and blanking plate return elements are internally connected. The first two focus electrodes (FE 1 and 2) are also internally connected to the acceleration and B1 blanking plate.

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## NOTES: (continued)

2. A maximum voltage difference of + 88 VDC between the blanking plate and the blanking plate return will be required to extinguish the beam.
3. Recommended range. Adjust for optimum focus.
4. Isolation shield, the flood gun accelerator and collimation electrode No. 1 are internally connected. Adjust for optimum luminance without compromising geometry. May be used as a geometry adjustment, if necessary.
5. Adjust to set operating point and/or non-store level.
6. Grid No. 1 - Flood gun "A" and "B" bias voltages are adjusted to get full coverage of the target.
7. Adjust for optimum collimation
8. Internally connected to CE5.
9. Maximum required range, adjust for desired intensity of writing beam. Cut-Off (visual extinction of undeflected spot can vary from -53 to -88 volts).

FLOOD GUN: (for test procedure, see P.S. No.8-0587)

Test Characteristics	P.S.8-0587 Step	Conditions	Specification Limit Using $K=2.0$
			$E_{co}$ $I_k$
Flood Gun $I_k$	1.0	Measured at 100 volts drive on FG Grid 1's (based on 70% of full activation with FGA & Cel set at 180V) Max $E_{co}$ = -230 volts Min $E_{co}$ = -140 volts	140-149 .76 ma min. 150-159 .70 " " 160-169 .64 " " 170-179 .59 " " 180-189 .54 " " 190-199 .49 " " 200-209 .46 " " 210-219 .43 " " 220-230 .40 " "
Upper Writing Limit	2.0	WG $I_b$ = 20 $\mu$ a 1K CM Sec	No Spec.
Stored Luminance	7.1	At operating point	200-6 fL minimum 201-2 fL minimum
Contrast ratio	7.3	Stored luminance background (luminance measured with calibrated photo meter) At operating point	2:1 minimum
Operating Point	5.0	WT +5 volts to UWL -5 volts	125 V to 275 V
Writing Threshold	3.0	WG $I_b$ - 20 $\mu$ a WS = 1K Cm/Sec.	No spec.
Operating Range	4.0	U.W.L. - WT volts	15V minimum
Collimation System Voltages	5.0	May be revised by 6.0 or 7.0 O.P.	Record for Instrument Manufacturing Test Department.
	11.0	Backplate voltage, non-stored Geom. CE3 CE4 CE5	
R Writing Speed:	6.0	W.G. $I_b$ 60 $\mu$ a & S.T.B. @ O.L. Center 7 x 9 cm	
Normal	6.1.1-6.1.11		200 - 25 Kcm/sec 201 - 100 Kcm/sec
Enhance	6.2.1-6.2.3		200 - 250 Kcm/sec 201 - 500 Kcm/sec
Integrate Mode	9.0	W.G. $I_b$ at 60 $\mu$ a, Time/Div at 4 $\mu$ sec. Erase, wait 10 sec., integrate sufficient sweeps to display a stored trace. (STB, Collimation set at Final Operating Conditions).	No breaks in trace > 0.025", no background areas Fade Up > 0.040" Ave. Dia.

continued FLOOD GUN:(for Test Procedure see P.S. 8-0587)

Test Characteristics	P.S. 8-0587 Step	Conditions	Specification Limit
Target Condition	8.0		
1. Ready-to-write a) Dark Defects b) Bright Defects	8.1	O.P.	See Table II See Table I
2. Fully-Written a) Dark Defects b) Bright Defects	8.2	O.P Within graticule area	See Table I 0.050" spot or line 0.050" long maximum
3. Non-Store a) Holes, Opaque spots	8.3	At non-store potential	See Table I
4. Glass Defects			See P.S. 8-0594
R Split Screen	10.0	One half the screen at OL and other half at non-store	must store within 2mm from split
R Storage Time	11.0	At WT or 125V, whichever is higher	Must meet contrast rat. specification after 15 minute

TABLE I		GRATICULE AREA		OUTSIDE GRATICULE AREA	
Defect	Size	Maximum No. Allowable	Minimum Separation	Maximum No. Allowable	Minimum Separation
Bright Spots in ready-to-write.	Over 0.025"	0	-	0	-
	0.021"-0.025"	3	1/2"	6	1/2"
Dark Spots in fully-written.	0.011"-0.020"	6			
	Total over 0.010"	6	1/4"	10	1/4"
Holes and Opaque Spots	0.007"-0.010"	8	1/4"	15 per sq. cm	
	Under 0.007"	Not rejectable			

TABLE II					
Dark spots in	Over 0.040"	0	-	0	-
ready-to-write	0.036"-0.040"	0	-	2	1/2"
	0.026"-0.035"	2	1/4"	4	1/4"
	0.007"-0.025"	12	1/8"	Not rejectable	
	Under 0.007"	Not rejectable unless they form a pattern.			

NOTE: The above numbers refer to the quantity of defects in each mode; (i.e. the number of defects in the ready-to-write mode should not be added to the defects in the fully-written mode or non-store mode.) Each type should also be considered independently; (i.e., if a bright spot in the ready-to-write mode is touching a dark spot, the two should not be measured as one.)

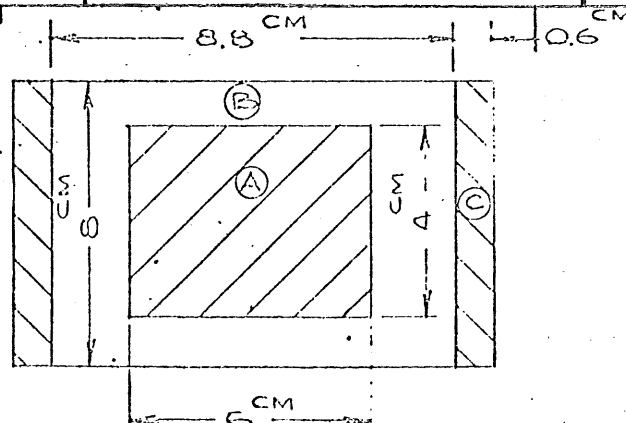
R WRITING GUN: (for test procedure, see P.S. 8-0595)

Test Characteristics	P.S.8-0595 Step	Conditions	Specification Limit
Gun-graticule bulb alignment	4.3	Align trace on left side of graticule. <u>Note:</u> Alignment to be maintained during following steps.	( $\pm 3$ degrees) 2.5 minor division
Trace alignment	4.3		
Grid #1 cutoff	10.0	Visual extinction of undeflected focused spot (visual) (unblanking off)	53 - 88 volts
Cathode Current	11.0	With grid #1 drive of 50V from cutoff, use following table: K 3.5 V <sub>co</sub>	
		53-55	0.92 ma minimum
		56-60	0.80 " "
		61-65	0.71 " "
		66-70	0.63 " "
		71-75	0.57 " "
		76-80	0.51 " "
		81-85	0.46 " "
		86-88	0.44 " "
Beam Current	12.0	With a small display approximately 1x2 Divisions to avoid current interception by the deflection plates and erroneous reading at $I_k - 0.3\text{ma}$ . Flood guns bias to cutoff.	35 $\mu\text{a}$ minimum
Blanking Plate B2 cutoff	13.3	Visual extinction of A focused display at 200 $\mu\text{A}$ $I_k$ . The following voltage is referred to the first anode Grid #2 & #3 and B1.	$\pm 88$ volts
Blanking Plate Shift	13.3	Total measured from cutoff to cutoff and under conditions stated in blanking plate cutoff above.	2.5 minor divisions
Geometry	6.2	With a normal 8x10 cm time marker displayed	Maximum deviation from straight line: Horiz. 0.5 minor div Vert. 0.5 minor div
Trace Orthogonality	6.1		$\pm 1$ degree $\pm 0.5$ minor division

R WRITING GUN: (for test Procedure, see P.S. 8-0595)

Test Characteristics	P.S. 8-0595 Step	Conditions	Specification Limit
Horizontal resolution (edge focus)	6.3	Edge focus is checked with time mark generator set at 100 $\mu$ s and time/div switch at .5msec. at $I_b$ 2 $\mu$ A	Markers in 10 major divisions.
Spot Centering	7.01	Horizontal:  Vertical: Vertical Deflection factor is not more than: 19.50 V/cm - 156 V/scan 19.75 V/cm - 158 V/scan 20.00 " - 160 " 20.25 " - 162 " 20.50 " - 164 "	Within $\pm$ 4.0 minor div from geometric center.  Vertical Centering error can be: $\pm$ 2.5md* from geometric center $\pm$ 2.25md " " " $\pm$ 2.0md " " " $\pm$ 1.75md " " " $\pm$ 1.5 md " " "
D3-D4 deflection factor (horizontal)	9.2	At geom voltage determined in 6.0, 7.0 P.S. #8-0587, fixed graticule. Meter: 100 range F/G adjusted for coverage non store	175 to 192.5 volts Tot (17.5 - 19.25 v/cm)
D1-D2 deflection factor (vertical)	9.1	At geom voltage above, fixed graticule. Meter: 100 range F/G adjusted for coverage non-store.	148 to 164 volts total (18.5 - 20.5 v/cm)
H-K leakage	4.5 & 20.1.2		See P.S. 8-0595 step 4.5 and 20.1.2
Linearity	14.0	Maximum (with 2 horiz. lines 2 major divisions apart vertical)	0.5-minor divisions
Maximum trace width (vertical resolution)	18.0	$I_b$ 5 $\mu$ a signal - 1 kc square wave (triggered) Amplitude - 2 major divisions Time/div switch at 0.5 msec	Area A 0.030 maximum Area B 0.040 maximum Area C 0.050 maximum

\*Minor divisions



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R WRITING GUN: (for test procedure, see P.S. 8-0595 continued)

R	Test Characteristics	P.S.8-0595 Step	Conditions	Specification Limit
	Burrs	15.0		See P.S. #8-0595
	Rod Charge	19.1		See P.S. #8-0595
	Gun Flare	16.0		See P.S. #8-0595
	Grid Emission	17.0		See P.S. #8-0595
	Cathode Interface	4.5 20.1.2		See P.S. #8-0595
	Effective Capacitance		Sample f 1/5, measured with Tek 130 L-C Meter. D1 to D2, guard others D1 to others, guard D2. D2 to others, Guard D1. D3 to D4, guard others. D3 to others, guard D4 D4 to others, guard D3	8.7 pf D1D2 (Max.) 6.0 pf D3D4 (Max.)