



## TEST PROCEDURE FOR T5641-200 &amp; 201, T5642-200

1.0 FLOOD GUN CATHODE CURRENT (F.G.I<sub>k</sub>)

- 1.1 Set geometry to 180 volts.
- 1.2 Writing gun Intensity OFF (CCW).
- 1.3 Set selector switch on storage plug-in to flood gun bias.
- 1.4 Switch to A and turn current knob to F.G.K. Turn F.G. 'B' bias OFF (fully CCW), zero voltage meter.
- 1.5 Press fade positive button and rotate the 'A' bias (CCW) until the spot is extinct; read the cut-off voltage on voltmeter, increase 'A' bias control (CW) to 100 volts from the cut-off voltage (100 volt drive).
- 1.6 Read and record in MA the cathode current from the L.V. current meter. Turn 'A' bias control full (CCW).
- 1.7 Switch the bias switch to 'B' and repeat the above procedure.
- 1.8 Switch selector to "Geometry" and set the voltage to that determined in the geometry check. (See P.S.8-0595)
- 1.9 F.G. coverage! Rotate 'A' bias control CW for complete screen coverage, repeat adjustment for 'B' bias, decrease the bias on the F.G. with the highest bias until the bias on both F.G.'s is the same, erase.

2.0 UPPER WRITING LIMIT (U.W.L.)

- 2.1 Switch the voltage selector to S.T.B.1. Rotate the store control CW to 175 volts (this is a nominal operating level).
- 2.2 Adjust C.E. 4 & 5 control for proper collimation, i.e., the edges should be adjusted out for complete screen coverage.\* Voltage selector to C.E. 3 and adjust C.E. 3 control for brightness uniformity (nominal 150 volts). After these adjustments, the screen should have good coverage.

**\*NOTE:** Maintain proper collimation and coverage during the test.

- 2.3 Make sure that there are no areas fading positive, nor any that are not covered.

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2.0 Upper Writing Limit (U.W.L.) (continued)

- 2.4 Switch display switch to non-store.
- 2.5 Vertical input selector to DC, time mark generator to 1.0 msec, trigger rate at 1 msec, time/div. switch to .5 millisec variable full CW (to calibrate), normal sweep.
- 2.6 Display markers on screen, adjust trigger level for stable display.
- 2.7 Adjust sweep length for 10.2 cm (horizontal) with the left edge aligned with the left graticule line.
- 2.8 Adjust vertical gain to 1 cm. Adjust for optimum focus.
- 2.9 Adjust the horizontal sweep (variable) control until each marker is 1 cm apart which is 1KCM/Sec.
- 2.10 Switch beam current switch to test, turn unblanking switch off, adjust w.g.I<sub>b</sub> for 20  $\mu$ a, turn unblanking on, switch beam current switch to operate.
- 2.11 Switch the time/div. coarse control from 0.5 msec to 10  $\mu$  sec. Do not change the time/div. variable control.
- 2.12 Position time marker to center 2 x 2 cm.
- 2.13 Adjust for optimum focus along slope of leading portion of display. The focus should not be re-adjusted until the W.T. is determined.
- 2.14 Selector switch to normal, and raster plug-in switch to 564. Adjust the amplitude for 7.6 cm. (3 lines/cm.), switch the selector switch for single raster. For continuously variable raster line generators, display 24 lines total.
- 2.15 Switch time/div coarse control back to 0.5 msec.
- 2.16 Switch the display switch to store S.T.B. 1 & 2. The screen should be completely covered.
- 2.17 Erase twice, wait ten seconds. Write the raster. Make sure all voltages are adjusted for coverage and storage, i.e., there are no breaks or fading positive of any lines within the graticule area.
- 2.18 If tube does not store over entire faceplate, readjust the S.T.P. and C.E. voltages; if the screen is fading positive, decrease the S.T.B. voltage; if the screen does not store, increase the S.T.B. voltage. Always erase twice and wait ten seconds for the screen to stabilize before writing.

2.0 Upper Writing Limit (U.W.L.) (continued)

- 2.19 After a 10 second wait, and the screen does not fade positive (i.e. when the unwritten area becomes as bright as the written area, or written line spreads spontaneously), increase the S.T.B. voltage. Erase twice, wait 10 seconds after each adjustment and rewrite.
- 2.20 The U.W.L. is the S.T.B. voltage at which the lines spread spontaneously to .025" greater than the trace width and/or the unwritten area becomes as bright as the written area and reaches a size of 0.025", in the 8 x 10cm display area. Once this point is determined, erase twice, wait ten seconds and rewrite. Allow the written area to remain for 30 seconds to determine if the fade positive voltage should be lowered because of the lines spreading on the written area fading up to the above limits. If the voltage is too high, decrease and recheck. Determine the U.W.L. within 2 volts. Record the voltage. Do not adjust any controls.

### 3.0 WRITING THRESHOLD (W.T.)

- 3.1 Adjust the S.T.B. voltage to U.W.L. -15V. Adjust C.E. 4 & 5 for proper coverage if needed.
- 3.2 Erase twice, wait 10 seconds, store the raster.
- 3.3 Check in the 7 x 9cm area to determine if the tube will write with no gaps greater than 0.025". If it does, decrease the S.T.B. voltage.
- 3.4 Erase twice, wait 10 seconds after each S.T.B. voltage decrease. Adjust C.E. voltages as needed for best coverage. Write the raster.
- 3.5 Continue Sec.3.2 and 3.3 until the tube will write with no gaps greater than 0.025". Adjust C.E. 4 & 5 for coverage and C.E. 3 for visual brightness uniformity in fully written mode.
- 3.6 The S.T.B. voltage at which gaps begin to exceed 0.025" is the W.T. (Determine the W.T. within 2 volts), record the voltage.

### 4.0 OPERATING RANGE (O.R.)

- 4.1 Subtract W.T. for U.W.L. and record on test report.

### 5.0 OPERATING LEVEL (O.L.)

- 5.1 Divide O.R. by 2 and add to W.T. Set the O.L. at this voltage or 10 volts below U.W.L., whichever is lower. This O.L. is an initial setting, the voltage may be modified in Sec.6.0 or 7.0.

R

### 6.0 WRITING SPEED

#### 6.1 NORMAL WRITING SPEED

- 6.1.1 Display switch to non-store.

- 6.1.2 Sine Wave Generator

200 - Frequency 2.5, Multiplier 1KHz

201 - Frequency 1.0, Multiplier 10KHz

- 6.1.3 Set signal selector switch to writing rate and trigger signal selector switch to A, vertical plug-in (2A75) to ext., and the horizontal plug-in (3B4) to normal trigger with trigger source selector to internal.

R 6.0 WRITING SPEED (Cont.)6.1 NORMAL WRITING SPEED (Cont.)

- 6.1.4 Set beam current switch to test and turn unblanking switch off. Adjust W.G.  $I_b$  for  $60\mu a$ . Then turn unblanking switch on and beam current switch to operate.
- 6.1.5 Adjust vertical gain for one cm and the horizontal sweep for 10 cm for 6 cycles/scan. Adjust focus and astigmatism for best focus on a  $45^\circ$  slope of the sine wave. Recheck beam current for  $60\mu a$ .
- 6.1.6 Adjust vertical gain for 3.2 cm and horizontal sweep for 10.2 cm with 8-10 cycles/scan.
- 6.1.7 Set display switch to store. Adjust S.T.B. voltage to O.L. Adjust W.B. 5, 6, and 7, for best collimation.
- 6.1.8 Switch horizontal plug-in (3B4) to single sweep and trigger to line.
- 6.1.9 Erase twice, wait 10 seconds, push single sweep button to write the sine wave at the top half of the CRT.
- 6.1.10 Repeat Sec.6.9 for center and lower half of the CRT.
- 6.1.11 Inspect for breaks  $\leq .025''$  in the 7 x 9 cm area. If breaks occur, the O.L. may be raised until there are no breaks. At no time may the O.L. be raised  $>UWL - 5V$ .

SAMPLE DATA ONLY: If no breaks occur, increase the sine wave frequency (maintaining 3.2 cm amplitude and 8-10 cycles/scan) by repeating Sec.6.9 until there is a break in the sine wave of  $.025''$ . Read the frequency setting from the Sine Wave Generator, multiply by 10, and record this number as the Normal Writing Speed.

SPECIFICATION: 200 - 25Kcm/sec  
201 - 100Kcm/sec

EXAMPLE: Frequency 3,4, Multiplier 1KHz  
 $WS = (3.4) (1KHz) (10cm) = 34Kcm/sec.$

The figure 10 comes  $(\pi)(3.2) = (\pi)(\text{Vertical amplitude of } 3.2cm)$

R 6.0 WRITING SPEED (Cont.)6.2 ENHANCE WRITING SPEED6.2.1 Sine Wave Generator

200 - Frequency 2.5, Multiplier 10KHz.

201 - Frequency 5.0, Multiplier 10KHz.

6.2.2 On the enhance plug-in, turn the enhance switch to on. Turn Writing Rate Increase Pot. fully clockwise and adjust pulse amplitude so that the target starts to fade-up when single sweep is pushed (area which has faded can be as much as 1/3 of the target area). Then adjust the Writing Rate Increase Pot. until an area of the target fades positive (this area  $\leq .040''$ ) by erasing the target, then pushing the single sweep button. Adjust the horizontal sweep for 8-10 cycles/scan and the vertical amplitude to 3.2cm.

6.2.3 Erase twice, wait 10 seconds, push single sweep to write the sine wave at the top half of the CRT. Repeat for center and lower half of the CRT. Inspect for breaks  $\leq .025''$ . If breaks occur, the O.L. may be raised until there are no breaks. At no time may the O.L. be raised  $>UWL - 5V$ . Repeat until the 7 x 9 cm quality area has been checked.

NOTE: If no area is fading positive after the sine wave is being displayed, the Writing Rate Increase Pot. may be turned higher until an area is faded up to the allowable specification. Also, it may be turned lower if areas of the target are fading up higher than the allowable specification ( $\leq .040''$ ).

SAMPLE DATA ONLY: If no breaks occur, increase the sine wave frequency (maintaining 3.2cm amplitude and 8-10 cycles/scan); repeat Sec.6.2.3 until there is a break in the sine wave of  $.025''$ . Read the frequency setting from the Sine Wave Generator, multiply by 10, and record this number as the Enhanced Writing Speed.

SPECIFICATION: 200 - 250Kcm/sec.

201 - 500Kcm/sec.

7.0 BRIGHTNESS7.1 STORED LUMINANCE

7.1.1 Turn W.G. intensity control fully counter clockwise.

7.1.2 Turn DC off, remove graticule, and turn DC on.

7.1.3 Set S.T.B. voltage at operating point.

## 7.0 BRIGHTNESS (Cont.)

### 7.1 STORED LUMINANCE (Cont.)

- 7.1.4 Adjust C.E. 4 & 5 for coverage.
- 7.1.5 Press the fade positive button.
- 7.1.6 Make sure there are no overhead lights reflecting on the CRT faceplate and that the faceplate is clean.
- 7.1.7 With a calibrated photometer, make the six point measurements, and record.
- 7.1.8 If the luminance is not within minimum specification, geometry, C.E. 3 voltage can be increased until minimum specification is made. DO NOT increase the geometry and/or C.E.3 voltages above 225 VDC.
- 7.1.9 If the luminance is still not within minimum specification, increase S.T.B. voltage until minimum luminance is achieved. DO NOT increase S.T.B. voltage above UWL -5V.
- 7.1.10 If the S.T.B. voltage increase is necessary as specified in Sec.7.1.9, this voltage becomes the O.P. for further measurements and WS must be checked at the new O.P.
- 7.1.11 Check to see that geometry is in specification if the geometry voltage is changed.

### 7.2 UNSTORED LUMINANCE

- 7.2.1 With S.T.B., Geometry, CE3, and CE4 & 5 voltages the same as stored luminance.
- 7.2.2 Erase twice, wait 10 seconds, and make the six point luminance measurements. Record.

### 7.3 CONTRAST RATIO (C.R.)

- 7.3.1 Divide unstored luminance into stored luminance using figures of each point.
- 7.3.2 If the minimum specification is not made, lower the S.T.B. voltage in 5-volt steps down to the W.T. +5V until minimum specification is made. (Repeat Sec.7.1 and 7.2 at each new voltage).

7.0 BRIGHTNESS (Cont.)

7.3 CONTRAST RATIO (C.R.) (Cont.)

- 7.3.3 If the C.R. is still out of specification, the geometry voltage and C.E. 3 can be raised to 225V.
- 7.3.4 Any time the S.T.B. voltage is lowered from operating point, the stored luminance and W.S. must remain within specification.
- 7.3.5 The final voltage determined on the S.T.B. must be used for O.P. in all other tests.
- 7.3.6 Record the O.P. geometry, CE3, 4, 5 voltages.

8.0 STORAGE TARGET CONDITION

8.1 READY-TO-WRITE

- 8.1.1 Set S.T.B. voltage at O.P. Adjust C.E. voltage as determined in Sec.6.0 and 7.0.
- 8.1.2 Erase twice, wait 10 seconds.
- 8.1.3 See P.S.8-0546 for specification limits.

8.2 FULLY WRITTEN

- 8.2.1 With all voltages set as in ready-to-write, fully write the screen with a raster.
- 8.2.2 See P.S.8-0546 for specification limits.

8.3 NON-STORE

- 8.3.1 Switch the S.T.B. to non-store.
- 8.3.2 Set time mark generator to 10 $\mu$ sec and time/div to .5 milliseconds.
- 8.3.3 Rotate stability and triggering fully CW to flood screen. Check for defects and see P.S.8-0546 for limits.



9.0 INTEGRATE MODE

- 9.1 Switch Beam Current switch to Test, switch Unblanking Off. Adjust W.G.  $I_b$  for 60  $\mu$ a. Unblanking On, Beam Current switch to Operate.
- 9.2 Switch Vert. Amp. to Gnd. and position trace to 0.2 cm above graticule centerline.
- 9.3 Set Time/Div. to 2  $\mu$ sec. and Variable to Midrange. Switch Trigger Mode to Single Sweep and Source to Line.
- 9.4 Switch S.T.B. to Store, Erase and wait 10 seconds.
- 9.5 Hold Integrate Button and Single-Sweep the target a sufficient number of times to meet the following specifications.
- 9.6 Check for a Stored Sweep with no breaks greater than 0.025" and no Background Fade-up areas greater than 0.040" Diameter.

10.0 SPLIT SCREEN STORAGE

- 10.1 Set the display switch in non-store for the upper screen and store for lower screen.
- 10.2 Set all C.E.'s geometry, and O.P. voltages same as in Sec.7.0.
- 10.3 Set the S.T.B 2 voltage at operating point. Set the time/div. at 50  $\mu$ sec. Set non-store voltage to approximately 90 VDC. Set  $I_b$  at 60  $\mu$ a.
- 10.4 Set the selector switch to normal raster, and adjust amplitude for 7.6 cm (3 lines/cm) adjust for best focus.
- 10.5 Switch the selector switch to single field.
- 10.6 Erase twice, wait 10 seconds. Press the single shot button.
  - 10.6.1 The lower screen must store the written trace visibly within 2mm from the split. The upper screen (in non-store) must not store the raster anywhere in the upper screen area.
- 10.7 If the upper screen (in non-store) does store, decrease the non-store voltage and repeat Sec.10.6 until there is no storage.
- 10.8 Record this non-store voltage and the tube must perform at this voltage with either the upper or lower screen in non-store.
- 10.9 DO NOT readjust any voltages, reverse the store, non-store set-up and repeat Sec.10.1 through 10.7.

10.0 SPLIT SCREEN STORAGE (Cont.)

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10.10 With the lower screen display switch in the store position and the upper screen display in non-store, erase the lower screen while observing the upper screen.

10.11 The upper screen "must not" fade positive at any time, while the lower screen is being erased.

11.0 STORAGE TIME

11.1 Place CRT in the T564B instrument.

11.2 Adjust view screen voltage to the W.T. or 125V, whichever is higher.

11.3 Adjust flood gun coverage per Sec.1.9.

11.4 Adjust C.E. 3,4,5 and geometry per Sec.2.2 (or Sec.6, or 7, if modified).

11.5 Erase twice and allow to sit in ready-to-write mode for 15 minutes.

11.6 At end of 15 minutes, check quality area for noticeable bright areas.

11.7 Brighter areas should be checked for contrast ratio by taking background luminance measurement in this area with calibrated photometer, fully store the area with writing beam, take written luminance measurement, and determine contrast ratio per 7.3.

11.8 If minimum contrast ratio is not met, rework tube per P.S.7-0807.

11.8.1 Repeat Sec.11.3 through 11.7.

11.8.2 If minimum contrast ratio is not met, reject tube.

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12.0 STRIP PAINTING PROCEDURES (FOR SHIPPED TUBES ONLY)

R 12.1 Connect wall band #6 (CE4) and preview area strip with a silver paint (Silpaint, manufactured by Fansteel or equivalent) as per sketch instruction, below.

12.2 Paint faceplate side contact areas to connect preview strip.

