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January 13, 1956

Trip Report

Destination: Lansdale Tube Company, Lansdale, Penna.
Date of Contact: November 21, 1955

Personnel Present: Mike Sadowsky, Philco
Don Payne, Philco
P.F.E. Marapodi, General Electric

Report By: P. F. E. Marapodi

Dist: L. C. Maier
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Purpose of Trip: To observe and obtain information on Philco's current screening techniques, the use of their iron oxide guard band and the dusting technique they had used to screen color t.v. tubes.

Discussion:

A. Philco's Current Screening Technique

In order to obtain a maximum amount of phosphor in their screened lines, Philco double-screens each color and eliminates the PVA and sensitizer in their phosphor slurry formulae. Specific formulae are:

1. Filming Stock Solution

   a. 25 gms PVA, grade 52-22
   b. 600 mls de-ionized water
   c. 200 mls anhydrous solox

2. Filming Solution

   a. For each 90 parts of the total volume of A(1) above (800 mls) add 10 parts (of this total volume) of anhydrous solox.
   b. 2.8 grams of ammonium dichromate

3. Blue Phosphor Slurry

   a. 90 gms blue phosphor powder
   b. 80 mls anhydrous solox
   c. 60 mls de-ionized water

4. Green Phosphor Slurry

   a. 70 gms green phosphor powder
   b. 80 mls anhydrous solox
   c. 60 mls de-ionized water

5. Red Phosphor Slurry

a. 90 gms red phosphor powder
b. 80 mls anhydrous solox
c. 60 mls de-ionized water

Note: Mike Sadowsky claims that solox and phosphor alone in the phosphor slurries will not yield a "dense" line. Water and phosphor alone yields fogging, poor drain patterns and difficulty in controlling uniform line "density". However, a mixture of water and solox with phosphor appears satisfactory providing each line is screened twice.

Remarks:

(a) Exposure times for the Philco process remain the same.

(b) We have increased our loading of phosphor in the screened line by eliminating the sensitizer and increasing the PVA concentration in the phosphor slurry formulae. Results obtained on single screening indicate that no advantage is gained by double screening with our method. We would be swinging in the wrong direction, economically, if we did screen twice. The answer to this problem is to concentrate on a process which will enable us to achieve this goal in a single screening attempt.

(c) Mike Sadowsky showed the writer a new experimentally-screened tube utilizing a single screening process for each color stripe. Under vacuum and spark excitation the appearance of the phosphor screen was superlative. Since this process has not yet been de-bugged, Mike would not divulge the processing instructions to me. However, he assured me that I would receive all the information I wanted once he was satisfied that the processing parameters were established and the results obtained were reproducible. To date according to Mike this information is not available to personnel beyond his jurisdiction for the above reasons. The screen I had observed showed no signs of phosphor cross-contamination in any of the color lines and none in the quard band for approximately 95% of the total area of the tube face. About 5% of the screened area in the corners showed excessive phosphor contamination and noticeable stains from developing. These are the problems to which Mike alludes when he stated that the process has yet to be de-bugged.

B. Iron Oxide Guard Band

Philco employs a new type master such that the iron oxide guard bands are photochemically screened and positioned between each color stripe. Philco personnel claim that the use of the iron oxide guard bands aid contrast by reducing the reflectivity of the aluminum film and also the ambient light effect by 50%.

Specific processing instructions are as follows:

1. Process

a. Photochemically screen the tube face with unactivated (inert) green phosphor.

1. Use filming solution A(2) above.
2. Use green phosphor slurry formulae A(4) above.

b. Photochemically screen the iron oxide upon the inert green phosphor stripe screened in B(1) above.

1. The filming solution consists of 60 parts of the total volume (800 mls) of A(1) above and 40 parts of the total volume (800 mls) of A(1) above of anhydrous solox and one gram of ammonium dichromate.
2. The iron oxide formula is:
   a. 30 gms of iron oxide, C. K. Williams
   b. 120 mls anhydrous solox
   c. 20 mls de-ionized water
3. Repeat step B-1-b twice for good loading of iron oxide in the line.

Remarks

To date we have screened good iron oxide lines, striving for quality and establishment of processing parameters. We have achieved this by modifying our own formulae which yielded better results than those obtained utilizing the formulae listed in this report. A report on our method will be published shortly.

C. A description of Philco's dusting method to screen color t.v. tubes.

1. Dusting Technique

a. Apply PVA to facepanel -flowcoat or spray
b. Dry
c. Expose
d. Wet with solox and drain
   1. Then go to step C-1-e or
   2. dry after step C-1-d or
   3. partially dry after step C-1-d
e. Dust on phosphor
f. Develop
g. Dry
h. Repeat steps C-1-a to C-1-g for the other two color stripes.

Remarks

a. In step C-1-a above, filming solution A(2) above can be used.
b. Our own filming solution can be used in step C-1-a above.

c. The phosphor powder in step C-1-e above must be dried before use to prevent clumping when applied.

d. The phosphor in step C-1-e above is applied under air or nitrogen pressure through a closed-end cylinder placed inside the bulb to be screened. The phosphor powder is ejected horizontally through orifices in the cylinder wall.

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