Distribution

GL Case
C Dichter
B Findeisen
WF Hopkins
LW Jenne
WL Jones
EM Krackhardt
FJ Mayer
CA Perkins
D Protzman
SS Sadowsky
EF Schilling
JH Shepp
S Sofia
PE Sullivan
GT Waugh
H. H. Gros

March 3, 1959

TRIP REPORT

P. P. Coppola

American Society for Testing Materials
Committee F-1
Mayflower Hotel, Washington, D. C.
December 25, 26, 27, 1959

I. Subcommittee I-A Electrical Test
G. R. Feaster, Chairman

A. Cathode Temperature Task Force
R. D. Wilson, Chairman

Since the last meeting held at Skytop, Pa. in November, 1958, the members of this task force have carried out a preliminary investigation of their respective assignments on temperature measurement methods, namely, Optical Pyrometer, Retarding Potential (Electron Temp.), Infra Red, Thermocouple, and Heater Resistance. At the moment the only write-ups made on these activities have been circulated among the task force members. However, an interim report is planned for early spring.

In respect to methods of temperature measurement the members of F-1-IA are showing the greatest interest in Retarding Potential and Infra Red techniques.

Westinghouse and Sylvania (as well as the writer) are actively engaged in work on the Electron Temperature method. Westinghouse has experienced some technical difficulties due in part to leakage problems and non-stability of cathode temperature during a measurement.

Dr. D. L. Whitcomb of Bell Labs is pushing Infra Red. He has assembled the necessary equipment for routine measurements. A high speed Kodak infra red film is used as the temperature detector. Calibration of the film is done by the simultaneous exposure of tubes with a test cathode and a cathode with a platinum, platinum-rhodium thermocouple attached.

Dr. W. G. Shepherd of the University of Minnesota is currently working on an infra red film method for the detection of poor cathode coating bond (adherence) through temperature distribution across a coating.

The Philips Co. (Dutch) is working with infra red techniques for determining cathode temperatures. Instead of film, a semiconductor detector is used. Reference: Philips Technical Review, Vol. 19, 1958.

B. Reference Planar Diode Task Force
R. T. Misra, Chairman

The specification for this diode has been accepted by the F-1 committee and now shall be submitted for letter ballot.

There is still considerable interest in this device as a test diode (particularly cathode ray tube manufacturers). The interest, however, is qualified to the extent that each individual company desires a certain amount of latitude in choosing the component materials. For example, some wish to use stainless steel electrode parts rather than P-50 nickel for some tests. Others wish to employ their own ceramics and heaters, etc. In every instance, however, the geometry of the diode is maintained. As mentioned in the last ASTM report this attitude is similar to that of the writer.

II. Subcommittee I-E Adherence
C. C. Powers, Chairman

Very little new material was reported. Suggestions from the audience were requested for some non-destructive methods for determining cathode coating adherence.

At the last meeting some discussions were held on poor adherence problems connected with the use of A-31 nickel (Superior Tube, 4% tungsten). Since that time Tung-Sol has been experimenting with their A-31 nickel with triple carbonate coatings. Poor adherence resulted regardless of cleaning techniques used. It was found, however, that an increase in the carbon content of the nickel brought about by hydrogen-methane atmosphere firing provided a pronounced improvement. Tung-Sol is not sure of the mechanism involved for the improvement.

III. Subcommittee X Contaminants
D. Koontz, Chairman

This is a new subcommittee recently organized by F-1 Committee because of the strong interest of electronics manufacturers in parts cleaning.

The objectives of the committee are to establish methods for the examination of components and processing facilities where there is a problem of influence of components in a device. Specifically, the subcommittee will look into the following:

(1) Reproducible and non-destructive methods and tools for determining surface adsorbed inorganic and organic contaminants.

(2) Test methods for checking atmospheres used in assembly, atmospheres used for heat treating, and liquids used for heat treating.

(3) Test methods for evaluating and identifying dust in the air.

Three task forces are planned, namely:

(1) Particulate Physics - Air born contaminants and measurement.

(2) Examination of processing liquids (water).

(3) Component surface examination.

During the discussion of the Subcommittee agenda Dr. John Sheldon of Corning Glass mentioned that his laboratory was doing work in the following areas:

(1) Study of glass surfaces in general as to:

(a) Effects on cathode emission of various contaminants in glass tubulations during tip-off.

(b) Effects of electron bombardment on glass.

(c) Examination of graphite and aluminum oxide in tube production.

(d) Effects of sublimation of materials on glass (electron bombarded) as they might influence cathode emission.

For much of this work two mass spectrometers are used full-time and one mass spectrometer half-time. Another mass spectrometer is being built for further study on electron bombardment of glass.

IV. Miscellaneous

A. Magnesium Oxide Cold Cathode

Discussions of this emitter were carried on by many of the electronic company representatives present at the ASTM meeting. The interest stemmed from the wide publicity given to the Tung-Sol, Signal Corp. announcement made to reporters on January 14, 1959 at the Waldorf Astoria Hotel in New York City.

Bell Labs. has assigned one engineer full-time to experimentally investigate the general nature of the magnesium oxide cathode, that is, in respect to art of preparation, emission characteristics and life time. Representatives of other companies have indicated a watch and wait attitude. A few people indicated that they were not yet sure what they would do. Others considered the cathode (in its present state) of no interest.

B. Sarong Cathode

As the name implies this cathode is one which employs a wraparound technique for applying a cathode coating to a base nickel cylinder. The process was developed at the Sylvania Receiving Tube Plant at Emporium, Pa. by Dr. Kirstteter. A recent patent (on order by the writer) in part refers to the process.

Apparently the cathode coating film is prepared in sheet form by spraying a carbonate suspension (probably with high resin content) on to a very flat glass or metal sheet which has been previously sprayed with barium nitrate. The nitrate acts as an interface to prevent sticking. Next the sheet is punched with a die to cut out a segment of a size required to cover a cathode nickel cylinder. Another spray of barium nitrate is applied to the sheet segment just prior to making contact with the nickel cylinder. Drying of the nitrate presumably causes the segment to curl completely around the cylinder. Complete details, of course, are lacking now.

Dr. R. E. Palmatier of Sylvania made the following claims and comments:

(1) A film can be made from any carbonate and of any density.
(2) Have worked around any processing problem and will work across the board on any tube type be it microwave, cathode ray, power, etc.
(3) Adherence - The film will not stick to a nickel sleeve if it is the least bit dirty initially. The film will stick to an etched or a bright nickel surface.
(4) Can easily prepare coating thicknesses now usually used for cathode preparation.
(5) Coating thickness can be controlled to 1/10 the tolerances obtained with normal coating methods.
(6) The coating method is applicable to cathode ray type cathodes, spherical surfaces and concave surfaces.
(7) The coating method can be a continuous process; however, there are still some mechanical difficulties which must be overcome before full transition from the laboratory to the factory can be completed.
(8) Close supervision of personnel is necessary for proper coating results.
(9) Cathode coatings are considerably more uniform from tube to tube, that is, the density of the coating and the thickness of the coating is the same at the center and the edges of the cathode.
(10) Cathode films can be stored for a year without spoiling.
(11) One million tubes have been made with sarong cathodes with good results.
(12) Cathode film will not be available from Sylvania for some time yet. Before sales are made Sylvania wishes first to find out how much use of the method they themselves will make.

No mention was made of the emission capabilities of the coating relative to emission obtained from spray and cataphoretic coatings. The writer has some misgivings in respect to emission capabilities of the coating especially since it is apparent that a higher than normal resin content in the coating is necessary.

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