



HEATER-CATHODE IMPREGNATION
SUBJECT: Process Specification

STANDARDIZING
NOTICE

34-14-5H

SUPERSEDES 12/15/52

Herein standardized is a process for the impregnation of heater-cathodes with a thorium nitrate solution paste. Initially used for magnetrons.

I. EQUIPMENT

- | | |
|----------------------------|--|
| A. Abbey Ball Mill | G. Sizing Jig (I.D.=.067" tapered on one end on the outside) |
| B. Flint Pebbles | H. Jeweler's Adjustable Pin Holder |
| C. Spatula | I. Glass Rod |
| D. 200-mesh Screen | J. 6" x 6" Flat Glass |
| E. Moly Boat | |
| F. Hydrogen Firing Furnace | |

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ACCORDINGLY FUTURE REVISIONS
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II. MATERIAL

- A. T604 Thorium Oxide
- B. T22 Thorium Nitrate (Solution of 5 parts distilled water to one part T22 Thorium Nitrate by weight).

III. PROCEDURE

A. Preparation of T604 Thorium Oxide for use in Emission Coating.

- Fill a moly boat with 100 gms T22 Thorium Oxide and heat in line hydrogen for 60 min. at 1800°C.

NOTE: (1) For initial use spray a new moly boat with thorium oxide and do not use this boat for any other purpose.
(2) Insert the moly boat into the furnace slowly to prevent splattering.

- After firing powder, break up powder, using a spatula or similar instrument.

NOTE: Powder in contact with boat will have turned black. Discard this portion.

- Ball mill material for 8 hours (Abbey Ball Mill - Flint Pebbles).
- Remove powder from ball mill and sieve thru 200-mesh screen. The material coming thru is to be used for impregnating heaters. Particles larger than 200-mesh are to be reprocessed, starting with the firing cycle.

B. Preparation of Emission Coating and Impregnating Heater

- Place some T604 thorium oxide, which has been processed as in Item III.A on a clean glass and add a small amount of T22 thorium nitrate solution to make a thick paste.
- Roll previously sprayed heater in this prepared paste until all openings are filled.
- Clamp the heater leg in the pin holder and continue building up coating until the O.D. of the coating is 1/16" greater than the I.D. of the cathode sleeve.

*General revision

ES;59/EG

* CHANGE
** ADDITION
*** DELETION



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III. PROCEDURE (Cont'd)

B. Preparation of Emission Coating and Impregnating Heater (Cont'd)

4. Smooth out the coating by working it with the glass rod.
5. Dry the coating under a heat lamp.
6. Size the heater with tapered sizing jig and remove the heater from the jig. Inspect the coating, and if -
 - a. The heater is uniformly covered, and no cracks or bare spots are visible, proceed to Step 7.
 - b. The heater has correctable flaws such as insufficient impregnating coating, repeat Steps 3 to 6.
 - c. The sprayed heater coating is chipped, reject heater.
7. Place a thin coating (approx. 20 mil) on heater from previous operation (Step 6).
8. Size with cathode sleeve. Remove the heater and inspect the coating, if -
 - a. The heater has no apparent defects, replace the heater in the cathode sleeve and place end spacer over heater end. Proceed with heater-cathode assembly operations.
 - b. The heater has correctable defects, rework (Steps 3-6).
 - c. The sprayed heater coating is chipped, reject the heater.

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