



Impregnated Cathode Handling Procedure

1. Packing

The cathode is packed with RP (A desiccant, oxygen absorber) in a vacuum sealed, specially designed container. The packing is inserted into a PTS bag (The clear bag) and an evaporated aluminum bag. Please cut the edge of the bags and remove the product when unpacking.

2. Notices

- (1). Unpack and assemble the cathode as quickly as possible to reduce exposure to air.
- (2). Once the product is removed from its packaging please store the product in a nitrogen environment or under a vacuum environment.
- (3). Once the product is removed from the evaporated aluminum bag it must be stored immediately as described under notice 2
- (4). Avoid any contact with contaminating foreign objects.
- (5). Avoid any mechanical shock to the product.

3. Process to activate

New JRC's recommended activation schedule

Note: It is important to reduce the pressure of H₂O gas in the vacuum state and complete the baking process of the entire unit since the impregnated cathode is sensitive and affected by H₂O gas.

(1). Vacuum drawing

Conduct less than 6×10^{-5} Pa (5×10^{-7} torr)

(2). Baking

Heat up the vacuum container (Including vacuum component such as the anode) for more than two hours, and completely bake until the degree of vacuum reaches less than 3×10^{-5} Pa (2×10^{-7} torr).

Standard condition for temperature at baking

Vacuum chamber(Using O-ring): less than 120 to 150°C approximately

Glass tubes: less than 350°C

Stainless metal tube: less than 350 to 450°C

(3). Cathode warm-up

Heat up the cathode by direct heating the heater, or radiation heating by using high frequency, infrared or other acceptable means. Heat up slowly while maintaining a high vacuum level to avoid degradation of cathode by thermal shock.



(Standard)

The vacuum level should be kept less than 3×10^{-4} Pa

The temperature should be kept to 1200°C during 20 to 30 minutes.

(4). An example of aging for activation of the cathode

Set the temperature of the cathode to 1150°C approximately, and increase the current density of the cathode current gradually until 5 A/cm^2 which is the accelerating voltage. Keep this condition for an hour. This is to avoid problems of the electrode construction or thermal conductance.

Keep the high vacuum level less than 7×10^{-4} Pa (5×10^{-7} torr) during this process of activation, even though the gas is released from the metals especially in the beginning of this process.

The condition and process changes are dependent on structural factors of the electric gun, anode and target so please contact us if you have any questions.

4. Operating conditions

Please use the product by setting the cathode temperature to 1020~1060°C). However, it is necessary to raise the cathode temperature until it gets around 1150°C if the current is not sufficient.

Excessive rise of the cathode temperature evaporates the impregnated materials (E.g. Ba, O) and these evaporated materials adhere to the vacuum tube and the electrode. This will degrade the performance of the product. It is better to operate under low temperature.

5. Problem Solving

If the cathode current is low after Aging (low cathode current at the aging is caused by the residual steam poisoning on the surface of the cathode)

(1) Run process 3(4) aging process again

(2) Process 3 activating again, after the open atmosphere.

(3) The process 3 to 5 are only based on our standard specification and it could depend on our customers' using conditions, as assembly accuracy, operating condition.