

# Brillite Neon Electrodes

## *Recommended Bombarding Procedure*

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Thank you for your interest in Brillite Neon Electrodes. To successfully process any neon electrode it is assumed that the operator employs all necessary pumping and bombing equipment including a precision manifold, precision vacuum gage, temperature gage, filling gage, bombarding milliamp meter, and a vacuum system capable of pulling the required vacuum at the required time.

**Step 1** – Close main stopcock. Close vacuum gage stopcock. Vent manifold to atmosphere SLOWLY via blowhose or vent stopcock. Attach subject unit to manifold. *HINT: Leave vacuum gage on during this process.*

**Step 2** – Close blowhose or vent stopcock. Turn on main vacuum pump. Connect temperature gage to subject unit. Connect bombarder leads to subject unit. *HINT: Make sure bombarder leads don't cross or touch subject unit. Gently heat tubulation with hand torch to vaporize any moisture.*

**Step 3** – Set bombarder to lowest current (push choke all the way in). Slowly open main stopcock. In a short time the sound of the main vacuum pump will get quieter, indicating that a vacuum is being drawn in the system. At this time, flash the bombarder. If an arc strikes through the subject unit, close main stopcock quickly. Turn bombarder on and adjust to 180 mA (or four times the milliamp rating of the electrode). Bombard subject unit until it reaches 100 degrees C (212 degrees F).

**Step 4** – Turn off bombarder. Open main stopcock. Let subject unit cool until touchable (approximately 120 degrees F). *HINT: What we have accomplished to this point is to remove any moisture that may have condensed in the subject unit during or prior to bending.*

**Step 5** – Close main stopcock. Admit 3 to 5 Torr (mm Hg) of air SLOWLY through the blowhose stopcock. *HINT: This will facilitate proper heating of the subject unit and complete chemical reaction during bombarding, thereby preventing subsequent staining or blackening.*

**Step 6** – Turn on the bombarder and draw to 180 mA (or 4 times the electrode rating) until the subject unit reaches 150 C (302 degrees F). *HINT: Maintain pressure of approximately 5 Torr in the system during this time. If pressure increases, SLOWLY work the main stopcock to maintain 5 Torr.*

**Step 7** – Increase bombarder current to 270 mA (or 6 times the electrode rating). Continue to maintain 5 Torr pressure in the system. When subject unit reaches 200 degrees C (392 degrees F), work the main stopcock to adjust system pressure to 3 Torr. Increase bombarding current to 360 mA (or 8 times

the electrode rating). The electrode shells should begin to glow deep red at this point.

**Step 8** – Maintain system pressure at 3 Torr until the subject unit reaches 250 degrees C (480 degrees F). Work the main stopcock to reduce pressure in the system to 1 Torr. *HINT: To avoid blackening, do not reduce system pressure below 1 Torr at this point.*

**Step 9** - Increase bombarding current to 450 mA (or 10 times the electrode rating). Continue to maintain 1 Torr pressure in the system and continue bombarding until the electrode shells glow orange. At this point the electrode shells are approximately 1050 degrees C. *HINT: For best evacuation of impurities from the subject unit, glass temperature should reach at least 350 degrees C (662 degrees F), but not more than 420 degrees C (788 degrees F).*

**Step 10** – Shut off bombarder. Open main stopcock and vacuum gage stopcock immediately. The main vacuum pump should be operating at full pumping speed. *HINT: The electrode shells should show an afterglow for about 20 seconds with no sign of sputtering or black rings.*

**Step 11** – Continue to evacuate the subject unit until a vacuum of less than 1.5 micron (.0015 Torr) is achieved. *HINT: At this point the tube should still be hot to the touch (in excess of 50 degrees C (122 degrees F). If the subject unit is allowed to cool below 50 degrees C prior to reaching 1.5 micron there may be unevacuated impurities remaining in the tube. If this premature cooling occurs, repeat the bombarding process again from Step 5.*

**Step 12** – Close vacuum gage stopcock. Close main stopcock. Quickly (in less than 30 seconds) backfill subject unit to required pressure. Never underfill.

**Step 13** – Tip off (or otherwise disengage) subject unit from manifold. Put subject unit on aging table and allow to age until gas discharge appears a clean, consistent color. Let cool for 10 minutes before dumping mercury from trap (if required). Tip off mercury trap and allow subject unit to age until mercury is evenly distributed throughout. *HINT: Never dump mercury while electrodes are hot to the touch (above 50 degrees C).*