

## Processing Method for Neon Tube

It is recommended that the electrode manufacturer's instructions be followed wherever possible. However, when instructions are unavailable, the following can be used as a basis for processing.

Shell Rating (mA).	Starting Current (mA).	Current Increase between 150°C and 170°C to:-	Current Increase between 200°C and 220°C to:-	Helium Rinse Current
20	100	300	-	200
30	150	250	400	500
50	200	400	600	500
90 / 100	250	450	600 / 700	500
120	300	450	800 / 900	500

### Setting Up

Insert mercury into the pumping tubulation reservoirs.

200 milligrams is recommended for small diameter tubes

Seal the tubes to the manifold

Whenever possible pump two tubes together

Connect a reliable temperature indicator at the centre of one of the tubes.

Increases in current are gradual and these increases are determined by various tube temperatures which can only be judged accurately using a temperature gauge. Alternatively a piece of paper can be used but the result will not be accurate.

The example described below relates to 30 mA electrodes. When processing other sizes the current settings should be adjusted to suit the relevant electrode size as stated in the table. [All current ratings are in milliamps].

### Bombarding

Open the main valve slowly.

The tube will begin to evacuate.

At 10 millibar [6 torr] pressure switch on the current

Allow the pressure to continue falling. At approximately 3 millibar [2 torr] the tubes will strike [light up].

Close the main valve and set the current to 150 mA.

The pressure will increase initially due to vaporisation of moisture. By opening and closing the main valve the pressure can be reduced to 3 millibar [2 torr].

Allow bombardment to continue

Maintaining the pressure to 3 millibar [2 torr].

Increase the current to 250 mA

This increase should take place when the tube temperature reaches between 150° C - 170° C.

Allow bombardment to continue

Opening and closing the main valve to maintain 3 millibar [2 torr] pressure. The electrode shells will begin to glow dull red.

Increase the current to 400mA

This increase should take place when the tube temperature reaches between 200° C - 220° C.

Allow bombardment to continue

The now rapidly heating electrode shells will release gases which must be pumped away continuously using the open/close main valve method to maintain 3 millibar [2 torr] pressure.

Open fully the main valve.

The valve should be opened when the electrode shells achieve a bright orange/red heat along their whole length [900°C] and the tube temperature reaches 250°C and left open for 5 - 7 seconds.

Switch off the current.

Allow the tubes to evacuate quickly to between 10-2 and 2 x 10-2 and the tube temperature to fall to approximately 100° C.

## Helium Rinse

This serves two purposes. Firstly, any residual gases left in the tubes will be diluted by the Helium. Secondly, the rinse will indicate whether adequate bombardment took place.

Introduce 5 millibar [4 torr] of Helium gas.

Switch on current and increase to 500mA.

Allow the tubes to burn for one minute.

If the gas discharge colour remains a consistent straw yellow, this indicates a clean, well bombarded tube.

Switch off the current.

Open fully the main valve.

Allow the tubes to evacuate fully. When the tube temperature has fallen to at least 50° C and a vacuum of  $10^{-3}$  is achieved the tubes can be filled with the required amount of rare gas and sealed off for ageing in.