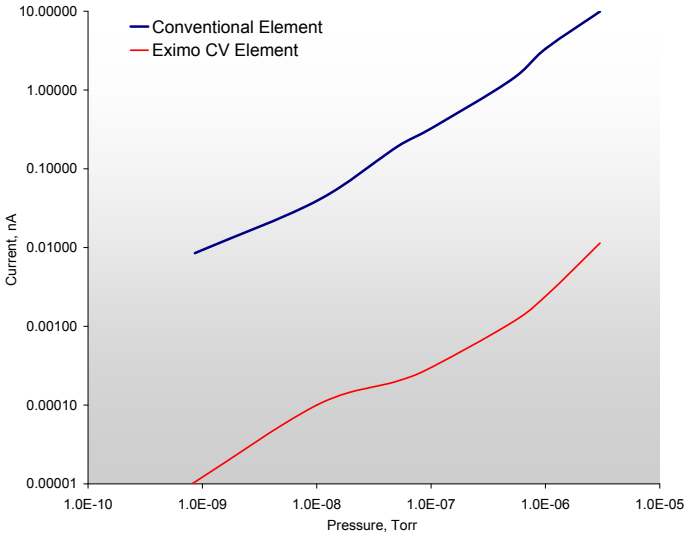
Eximo
Small Ion Pump Shielding
US Patent No. 7.850.432 B2

Charged and neutral particles are generated within an ion pump through normal operation. These particles can emit from pumping ports directly or as secondary electrons generated from particle impact.

Emissions can effect application results through conductive coatings or additional current to application instrumentation. Eximo ion pump shielding reduces emissions from an ion pump by a factor of 1000.

PERFORMANCE CHARACTERISTICS

Emission Current vs. Pressure
25S (pictured) measured at 7 kV



TECHNICAL SPECIFICATIONS

Element type	CVX	DIX
25S pumping speed (l/s, nitrogen)	18	14
45S pumping speed (l/s, nitrogen)	36	32
75S pumping speed (l/s, nitrogen)	68	54
Starting pressure (mbar)	≤ 1 x 10^{-3}	
Lifetime (hours @ 10^{-6} mbar)	50,000	
Ultimate pressure (mbar)	< 1 x 10^{-11}	
Maximum baking temperature (°C)	250 / 450 (without magnets)	

Eximo Small Ion Pump Shielding

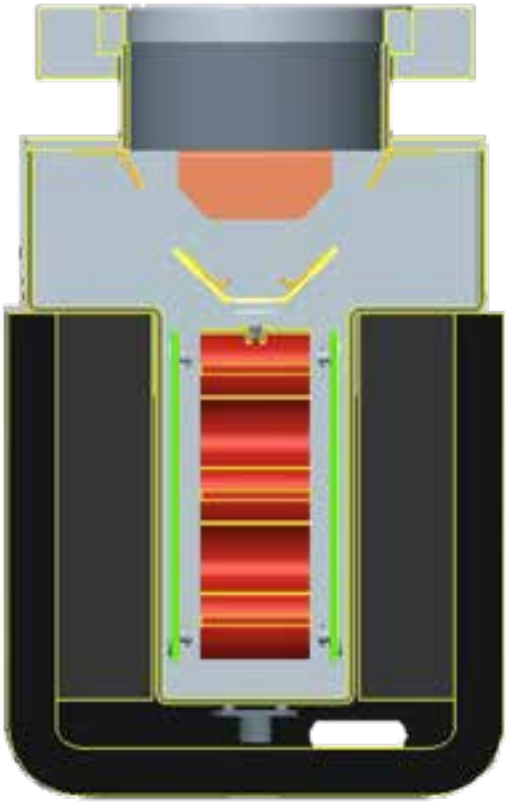
High energy impact of ions with ion pump cathode materials results in a combination of the following:

- The reflection of the impacting ion as a high energy neutral
- The release of cathode material as high energy neutrals
- The release of other high energy ions and their disassociated electrons
- The creation of x-ray photons

Electrons are largely contained within the anode/cathode assembly of the ion pump due to the large electrical potential needed for normal ion pump operation. Neutral particles and photons are not affected by the electrical potential or high magnetic field within the ion pump and can consequently emit from the anode/cathode assembly (shown below as a green area).

Neutral particles and photons generate secondary particles upon impact with their line of site targets. These secondary particles consist mainly of electrons. Neutral materials emitted from an ion pump can deposit on external surfaces at rates up to and exceeding 0.9 ŽÅ per hour, dependant upon sustained pressure. Upon impact outside the ion pump, secondary particles are generated and can contribute to application measurements with consequences that vary depending upon the application.

Charged grids and plates have no affect on neutral particles. Grounded shields can eliminate external line of site neutral impact. They do not stop secondary electrons generated at locations within the ion pump that have line of site to the pumping ports.



EXIMO ion pump shielding incorporates a series of baffles that:

- Block direct emission of high energy primary particles
- Block secondary particles created from high energy primary particle impact
- Retain pumping speed by allowing full conductance into the ion pump

Anode assembly (ion source)

Cathodes (neutral source)

Ion path

Standard neutral path

Secondary particle path

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