

ELECTROGEN™ Electron Generator Arrays

Features

- ✓ Electron impact ionization sources
- ✓ Fluorescent display screens
- ✓ Electron scrub sources
- ✓ Sample discharge for SEMs
- ✓ Mass spectrometry
- ✓ Residual gas analysis

Applications

- ✓ Uniform, High Density Electron Flux
- ✓ “Cold” ionization source
- ✓ Excellent stability
- ✓ Custom shapes and sizes
- ✓ Low maintenance
- ✓ Fine emission control
- ✓ Applications support



PHOTONIS patented **ELECTROGEN™ Electron Generator Arrays (EGAs)** consist of millions of precision glass tubes fused together to produce a uniform and mechanically rigid structure. They are processed such that, when a voltage is applied across the thickness, each pore produces a beam of electrons. With each of the millions of pores producing electron, the resultant electron flux is extremely uniform and dense.

An EGA does not require any warm-up time, and will not burn out. No heat-up and stabilization period is required. EGAs require much less maintenance than filament sources while providing much higher current densities. EGAs are available with emission areas in a variety of shapes and sizes from 4 to 150 mm diameter.

In mass spectrometry applications, EGAs can be used as the electron source in electron impact ionization sources. This new technology has the advantage of performing as a cold ionization source. In conventional sources the heat from the filament often causes pyrolytic effects. Pyrolytic effects occur when the heat generated by the filament chemically changes the unknown substances to be identified. Once ionized, this altered substance does not produce an ion representing the original substance. The use of a cold electron source eliminates this concern.

Flux density

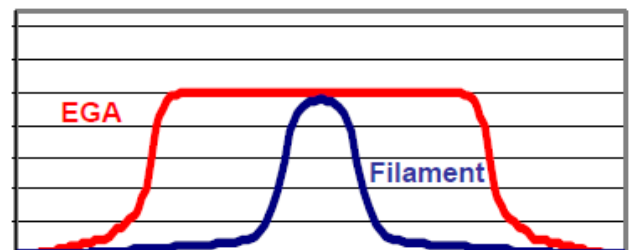
Typically, a single EGA will produce an electron flux density exceeding 1.0×10^{-10} A/cm². By using a Chevron™ or Z-Stack configuration, current densities up to as 2.0×10^{-5} A/cm² can be reached. The flux density is uniform to within 10% across the entire emission area.

Stability

The ELECTROGEN™ will provide exceptional stability over its lifetime when properly degassed. Upon application of the bias voltage, the EGA will provide virtually instantaneous, rock solid electron flux. The output will vary less than 1% in 24 hours and will drift less than 10% after 40 coulombs/cm² of extracted charge.

EGA assemblies

PHOTONIS EGA can be provided in an easy to use assembly. A standard configuration consists of Electron Generator Plates assembled in single, Chevron™, or Zstack assemblies mounted in stainless steel hardware with mounting holes and electrical connection terminals. Sizes range from 4 to 150 mm diameter. Custom sizes are also available. These assemblies are available with optional output grids for electron energy discrimination.



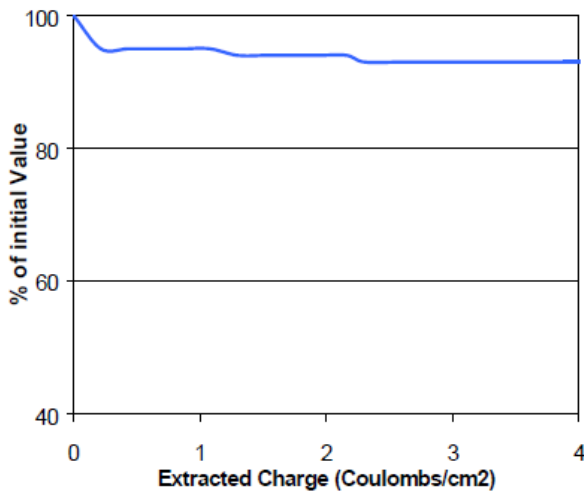
PHOTONIS EGAs provide a uniform electron flux over a wider area than conventional filament sources.



ELECTROGEN™ Assemblies can be supplied with mounting hardware and electrical contact tabs.

ELECTROGEN™ Electron Generator Arrays Specifications	
Operating Temperature Range	-50° to 100°C (Configurations available to 300°C)
Bake Out Temperature (maximum)	350°C
Operating Pressure (maximum)	1.0x10 ⁻⁴ torr
Electron Flux Density (Chevron™) at 2400 V (minimum)	1.0x10 ⁻⁶ A/cm ²
Operating Voltage (Chevron™)	1800 - 3800 VDC
Electron Flux Uniformity	± 10% across the active area

Typical EGA Stability



Typical Electron Generator Array Emission Current

