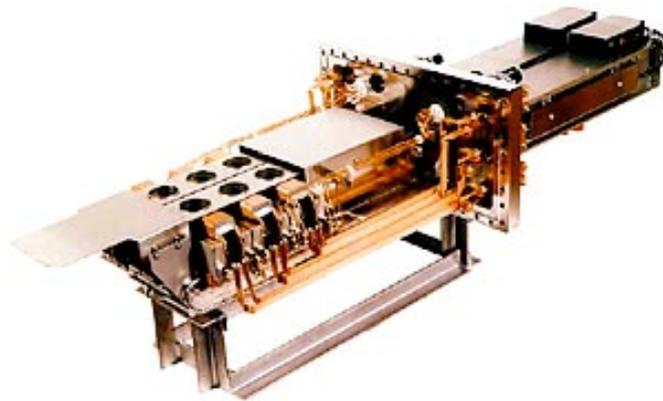




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Thermionics' HCseries e-Gun™ Electron Beam Evaporation Sources

A Competitive Comparison



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A Competitive Comparison

Thermionics' High Capacity (HC) series, e-Gun™ electron beam evaporation sources offer several advantages over competitive evaporation sources.

The following is a summary of those advantages:

- The e-Gun™ uses and provides the user, whether scientist or manufacturer, with a unique magnet system, sweep coils, manufacturing processes, service and maintenance advantages, and;
- As a result the Thermionics e-Gun™ has better beam collimation, better and higher rates, greater beam density, better uniformity, higher yields, and easier maintenance with less down time.

Magnet system:

Thermionics' magnet system is more powerful and designed to prevent losses in field strength caused by routine use, maintenance, and time. You can disassemble, clean, and reassemble it without damaging the permanent magnetic field, so the beam will still center at the same voltage after reassembly.

Competitor's sources have a marginal permanent magnet for their pole piece system. The pole material they use has a poor hysteresis loop, which is a magnetic memory loop. Simply taking off the poles and replacing them can change the centering voltage of competitor's sources from 10 kV to 7 kV or even lower, from 6 kV to 4 kV.

With competitor's sources, after the source is taken down for maintenance it loses strength and often cannot be operated at full voltage after cleaning. Most competitor's sources we encounter in the field will not center at 10kV and require excessive beam



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sweep current to operate at this voltage which reduces the power the source can utilize for evaporation but also change the source operating characteristics. As voltage is reduced, the beam size/density changes, affecting uniformity as well as rate.

Magnetic Dipole System:

Thermionics' sources use multiple dipoles within the magnetic system to keep the beam density constant as the beam is swept throughout the crucible area. Competitor's sources do not, so as you sweep them the beam shape/density changes, resulting in a temperature change, leading to a less consistent coating uniformity.

Sweep coils:

Thermionics' sweep coils are wound in our own transformer manufacturing facility (Delnetics Inc.) to rigid specifications using vacuum compatible materials. They are baked and sealed to prevent any chance of system contamination. The enclosures are helium backfilled to provide a simple clean method of detecting leaks. All coils are leak tested at Thermionics' facility. Competitor sources use diffusion pump oil to cool their sweep coils. If a coil enclosure/can leaks or a feedthrough fails or breaks you can contaminate your vacuum system. Competitors also use o-ring seals for their coils, which cannot be leak tested with a standard helium leak detector.

Direct Manufacture:

Thermionics manufactures the majority of its products and components in house. This includes: machining, welding, vacuum furnace brazing, transformer and coil manufacturing facilities. With several vacuum test stations and coating systems we offer high pot testing, inductance testing, magnet testing and charging; including the capability to run and test all sources and electronics at any power level. Our application lab can test materials and provide sample coatings in many cases (charges may apply). Our competitors do not directly manufacture most of their product line and/or components, limiting their research and development capabilities as well as their ability to support their own older models.



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Service:

Thermionics continues to service all e-Gun™ sources and power supplies. We offer both upgrades to most older models (pre-1990 vintage) and the ability to repair and service these older models to original specifications. While many of our older sources have been replaced by improved designs we continue to service older models as we understand how important this is to our customers, especially facilities using a large quantity of our e-Guns™.

We can also service all competitive sources, including Varian, Temescal, Telemark, Sloan, Joel and/or any other manufactures. While Telemark themselves does not service their older models, Thermionics repairs, rebuilds, and replaces older Telemark sources and electronics.

Since 1958 Thermionics has engineered, designed, and manufactured vacuum coating equipment. We started selling e-Gun sources in 1962. Our engineering and manufacturing team has over 85 years of experience designing and manufacturing e-Guns. Having worked with the original Temescal scientists, engineers, and designers our experience and expertise developing and manufacturing superior evaporation sources is unparalleled.

Let us know how we can best serve your e-Gun needs.

Contact us with your requirements: sales@thermionics.com / 360-385-7707