

## e-Vap® 100 System

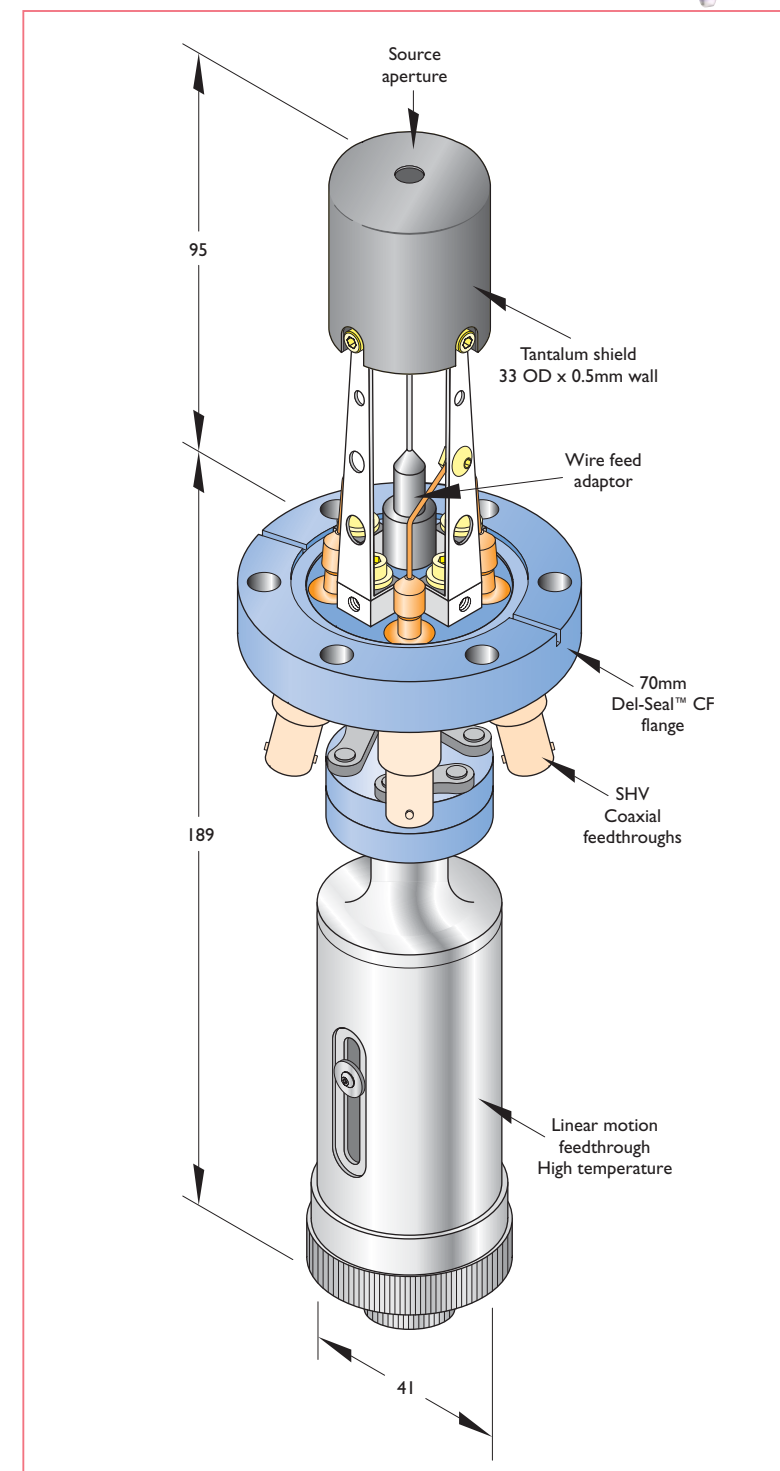
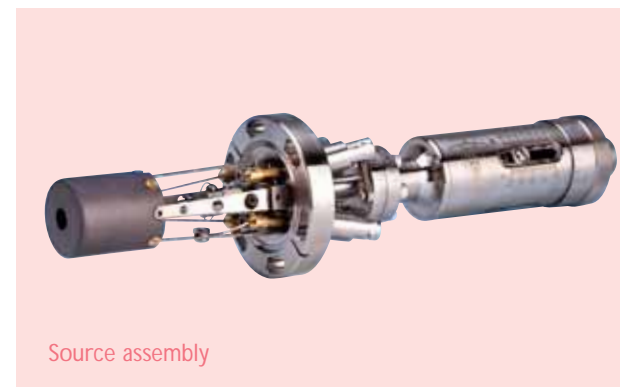
### Specifications

<b>Metering</b>	Digital emission current
<b>Cooling</b>	Air cooled
<b>Input power</b>	220V ±10%, single-phase, 50/60Hz, 3A
<b>Voltage output</b>	2kV, DC negative polarity
<b>Output ripple</b>	Less than 2% RMS
<b>Voltage regulation</b>	1%
<b>Current output</b>	0 to 0.05A
<b>Emission current regulation</b>	1%
<b>Efficiency</b>	85%
<b>Weight</b>	9kg
<b>Dimensions</b>	483w x 84h x 457l

### Features

- 100W power supply
- Monolayer e-beam deposition
- Precision control deposition rates
- 1mm wire feed mechanism, 2mm optional
- Refractory materials evaporation
- UHV compatible to 10<sup>-11</sup> Torr
- Bakeable to 250°C
- No water cooling required
- Mounted on 70mm Del-Seal™ CF flange

e-Vap® 100 is a precision monolayer deposition source employed for evaporative coatings in UHV applications. Its unique design uses an electron beam power source for thermionic emission and pinpoint electrostatic focussing of an electron beam onto a 1mm diameter wire. The wire being evaporated is at ground potential and serves as the source anode, thus attracting electron bombardment. The constant stream of electrons heats the wire tip to its melting point forming a very small liquid ball, which is subsequently vaporized. The wire is manually fed by a precision linear drive feedthrough, and must be fed periodically as determined by source evaporation rates. The e-Vap® 100 source evaporates high-temperature refractory metals including tantalum, molybdenum and tungsten and most other materials manufactured in a wire form. High-temperature



### Monolayer deposition rates

Numbers indicate the time in minutes required to deposit one monolayer of the specified element. Deposition rates are calculated at element melting point, using a substrate area of 1cm<sup>2</sup>, a source to substrate distance of 10cm and a vapour pressure of 10<sup>-3</sup> Torr. These values are intended as reference only, actual rates may vary from those listed.

<b>Li</b> 0.4 Lithium	<b>Be</b> 1.3 Beryllium	<b>B</b> 2.2 Boron	<b>C</b> 2.8 Carbon	<b>N</b> Nitrogen	<b>O</b> Oxygen										
<b>Na</b> 0.4 Sodium	<b>Mg</b> 0.6 Magnesium	<b>Al</b> 1.2 Aluminum	<b>Si</b> 1.5 Silicon	<b>P</b> Phosphorus	<b>S</b> Sulphur										
<b>K</b> 0.3 Potassium	<b>Ca</b> 0.6 Calcium	<b>Sc</b> 1.2 Scandium	<b>Ti</b> 1.6 Titanium	<b>V</b> 2.0 Vanadium	<b>Cr</b> 2.0 Chromium	<b>Mn</b> 1.7 Manganese	<b>Fe</b> 2.1 Iron	<b>Co</b> 2.2 Cobalt	<b>Ni</b> 2.2 Nickel	<b>Cu</b> 2.1 Copper	<b>Zn</b> 0.9 Zinc	<b>Ga</b> 1.8 Gallium	<b>Ge</b> 2.1 Germanium	<b>As</b> Arsenic	<b>Se</b> Selenium
<b>Rb</b> 0.4 Rubidium	<b>Sr</b> 0.7 Strontium	<b>Y</b> 1.4 Yttrium	<b>Zr</b> 2.1 Zirconium	<b>Nb</b> 2.7 Niobium	<b>Mo</b> 2.8 Molybdenum	<b>Tc</b> 3.0 Technetium	<b>Ru</b> 3.1 Ruthenium	<b>Rh</b> 2.8 Rhodium	<b>Pd</b> 2.4 Palladium	<b>Ag</b> 1.9 Silver	<b>Cd</b> 1.1 Cadmium	<b>In</b> 1.9 Indium	<b>Sn</b> Tin	<b>Sb</b> 1.4 Antimony	<b>Te</b> 1.4 Tellurium
<b>Cs</b> Caesium	<b>Ba</b> 0.8 Barium	<b>La</b> 1.7 Lanthanum	<b>Hf</b> 3.0 Hafnium	<b>Ta</b> 4.0 Tantalum	<b>W</b> 4.3 Tungsten	<b>Re</b> 4.4 Rhenium	<b>Os</b> 4.5 Osmium	<b>Ir</b> 4.2 Iridium	<b>Pt</b> 3.7 Platinum	<b>Au</b> 2.9 Gold	<b>Hg</b> Mercury	<b>Tl</b> Thallium	<b>Pb</b> 1.7 Lead	<b>Bi</b> 1.7 Bismuth	<b>Po</b> 1.5 Polonium
<b>Fr</b> 0.4 Francium	<b>Ra</b> Radium	<b>Ac</b> 2.0 Actinium													
<b>La</b> 1.7 Lanthanum	<b>Ce</b> 2.6 Cerium	<b>Pr</b> 1.7 Praseodymium	<b>Nd</b> 1.7 Neodymium	<b>Pm</b> Promethium	<b>Sm</b> 1.4 Samarium	<b>Eu</b> 1.0 Europium	<b>Gd</b> 1.8 Gadolinium	<b>Tb</b> 1.9 Terbium	<b>Dy</b> 1.7 Dysprosium	<b>Ho</b> 1.8 Holmium	<b>Er</b> 1.8 Erbium	<b>Tm</b> 1.6 Thulium	<b>Yb</b> 1.4 Ytterbium	<b>Lu</b> 2.1 Lutetium	
<b>Ac</b> 2.0 Actinium	<b>Th</b> Thorium	<b>Pa</b> Protactinium	<b>U</b> 3.3 Uranium	<b>Np</b> Neptunium	<b>Pu</b> Plutonium	<b>Am</b> 2.1 Americium	<b>Cm</b> Curium	<b>Bk</b> Berkelium	<b>Cf</b> Californium	<b>Es</b> Einsteinium	<b>Fm</b> Fermium	<b>Md</b> Mendelevium	<b>No</b> Nobelium	<b>Lr</b> Lawrencium	

materials are not readily evaporated using Knudsen or Effusion cells, making the e-Vap® 100, because of its miniature size, an excellent physical vapour deposition evaporation source.

The elements table adjacent depicts calculated deposition rates for various pure materials. The e-Vap® 100 source is constructed with refractory metals for rapid equilibrium with minimal outgassing, to withstand elevated temperatures without the need for water cooling and to reduce the possibility of contamination in sensitive UHV applications. The source has an outgas mode to allow vacuum conditioning of the evaporation head. The degas feature allows heating of the e-Vap® 100 head to drive off any adsorbed contaminant. The source is mounted on a 70mm Del-Seal™ CF flange. Power connections are made via four, SHV-coaxial connectors clearly labelled for filament positive, filament negative, anode and screen inputs. Maintenance on the evaporation head is made simple with easy replacement of all key components.

The e-Vap® 100 power supply incorporates all switching technology for the high-voltage and filament sections. This translates to a smaller, lighter package, greatly improved arc suppression and better emission current control. Arcs are suppressed in the order of microseconds rather than millisecond response in other 50/60Hz systems. This, combined with lower levels of stored energy, prevents the molten tip of the evaporant rod from being 'blown away' during an arc, a common occurrence with older systems.

Description	Reference	Part number	£	€	SFr.
Complete system <sup>1</sup>	EV-100	<b>991029</b>			
Source assembly	EV-SA-100	<b>992458</b>			
100w power supply	EV-PS-100	<b>991192</b>			
Power supply spare parts kit	EV-PS-SPK-100	<b>991257-07</b>			
2mm wire-feed adaptor	EV-2MM-100	<b>992589</b>			
Filament set, 5 each	EV-FIL-100	<b>992596</b>			

<sup>1</sup> Includes source and power supply



## e-Vap® 300 System

### Features

- 3kW switching technology power supply
- UHV compatible
- 70mm Del-Seal™ CF flange mount
- Includes water and electrical connections
- Evaporates refractory and dielectric materials
- CE compliant

### Specifications

<b>Metering</b>	Digital emission current
<b>Cooling</b>	Power supply: air cooled Source: water cooled
<b>Input power</b>	220V ± 25V, single-phase, 50/60Hz, 18A
<b>Voltage output</b>	5kV, DC negative polarity
<b>Output ripple</b>	Less than 1% RMS
<b>Voltage regulation</b>	.025%
<b>Current output</b>	0 to 0.6A
<b>Emission current regulation</b>	0.25%
<b>Efficiency</b>	85%
<b>Weight</b>	29kg
<b>Dimensions</b>	483w x 267h x 483l

Caburn-MDC's 3kW electron beam source is a versatile and economical deposition tool used for thin film coating processes in high and ultra-high vacuum environments. The e-Vap® 3000 system evaporates virtually all rare earth refractory and dielectric materials. It provides researchers a simple, relatively low-cost means of depositing high-purity, thin-film coatings.

The source is manufactured using all metal sealed gaskets, is extremely compact and has a high level of ruggedness, reliability and efficiency. The compact source design allows the entire source assembly to fit through a 70mm Del-Seal™ CF port opening and eliminates internal water and electrical connections. This 3kW source is available free standing or as a complete turn-key system.

The filament/emitter assembly has a heat sink and features a unique single piece, high-voltage insulator design. The entire emitter assembly slides out for easy maintenance.

A new 3kW switching power supply is available to drive these miniature sources. State-of-the-art switching technology renders a compact, rack-mountable power supply. The built-in source controller also employs switching technology and provides extremely accurate e-Vap® evaporation sources.

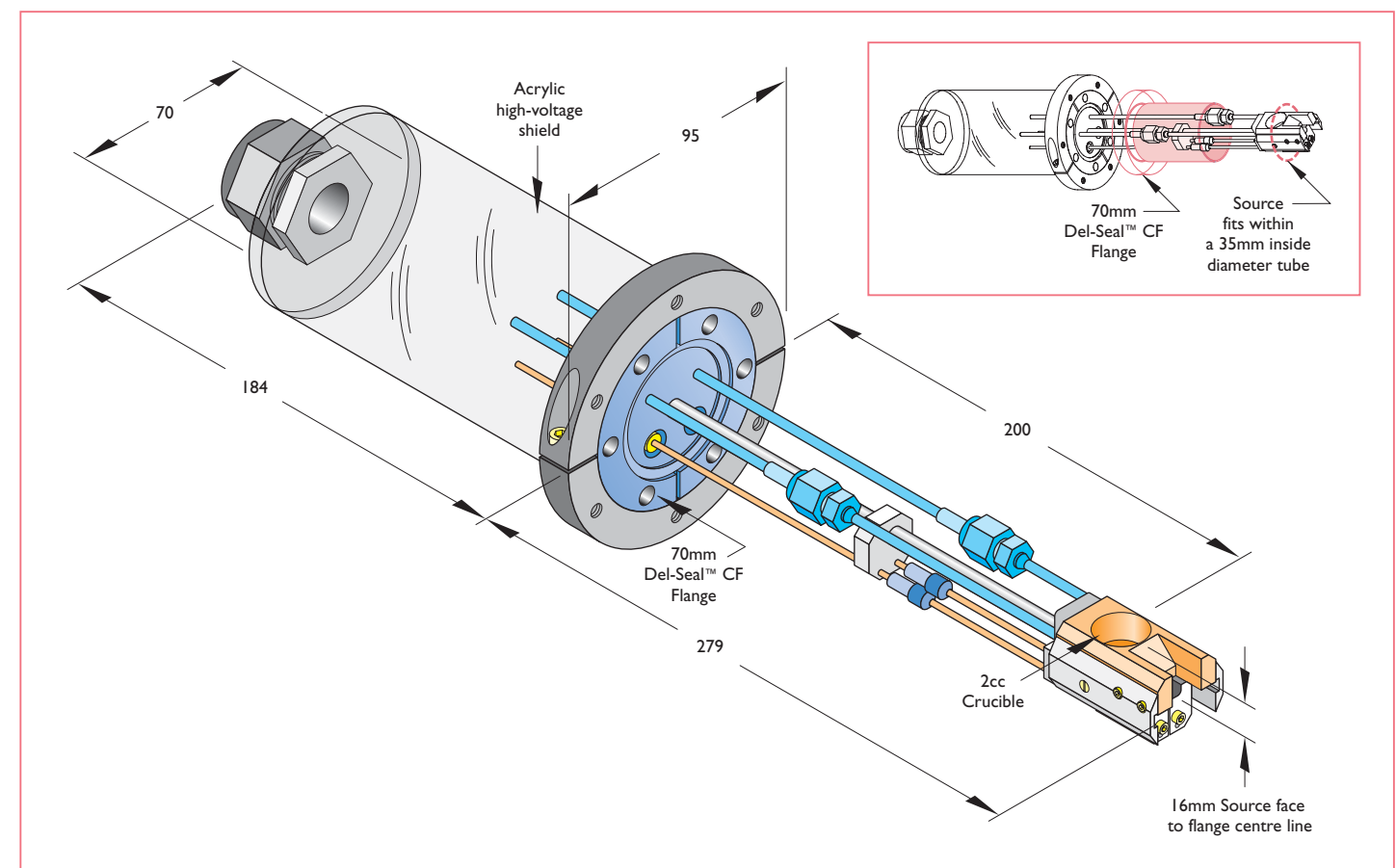
These liners offer improved thermal stability while reducing the transfer of heat to the crucible. Liners provide the ability to easily and quickly switch evaporant materials without removing the crucible for cleaning. They also reduce power requirements to achieve specific evaporation rates. See page 594 for a detailed list of crucible liner materials.



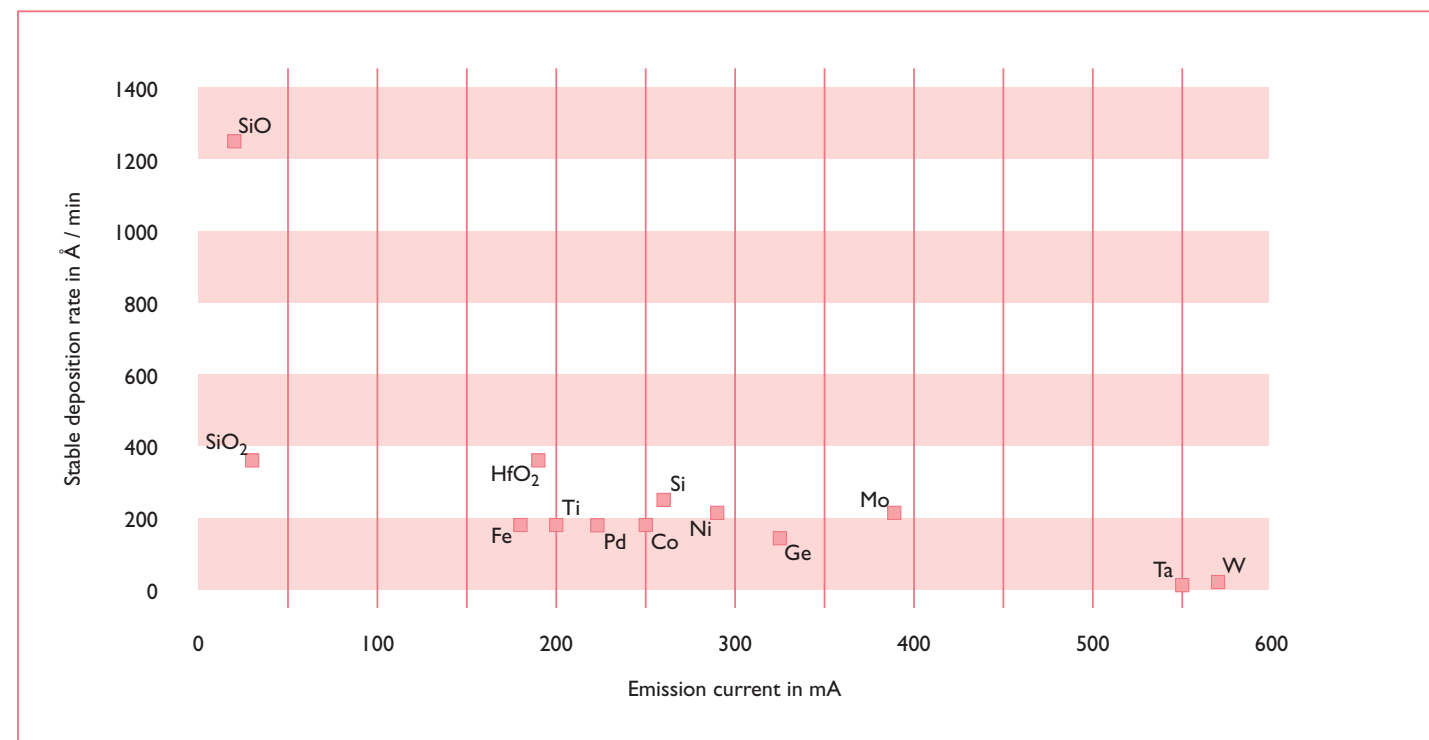
Power supply



Source assembly



## Deposition rate V emission current



Source detail



Filament detail

Description	Reference	Part number	£	€	SFr.
Complete system <sup>1</sup>	EV-CE-3000	<b>992600</b>			
Source assembly	EV-SA-3000	<b>992601</b>			
3000w power supply	EV-PS-CE-3000	<b>991221</b>			
Filament set, 5 each	EV-FIL-3000	<b>992610</b>			
Anode	EV-A-3000	<b>991929</b>			
Beam former	EV-BF-3000	<b>991922</b>			
Beam former insulator	EV-IBF-3000	<b>990529</b>			
High voltage insulator	EV-IVH-3000	<b>991921</b>			
Power supply spare parts kit	EV-PS-SPK-3000	<b>991257-03</b>			

<sup>1</sup> Includes source and power supply.