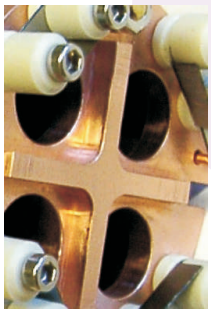
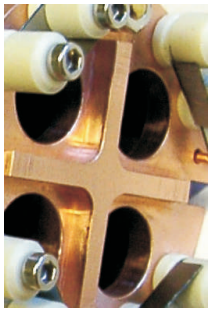
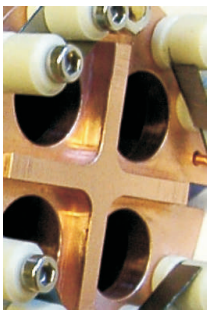
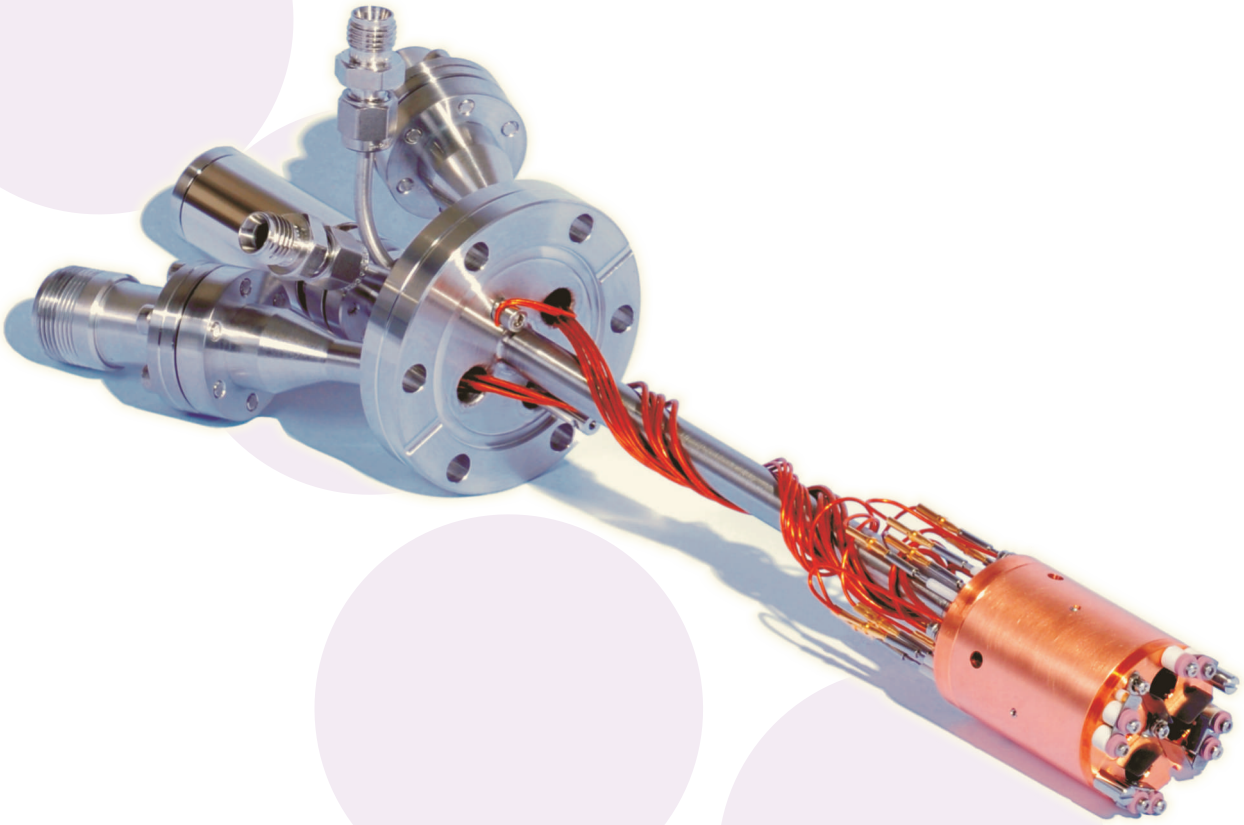
QUAD-EV

Mini e-Beam Evaporators









Features

- 100% UHV constuction
- Integral flux monitoring for all pockets
- Independent high-voltage lines
- Efficient structural cooling
- Automatic power and flux control available
- Software control
- Evaporation from rods or crucibles
- Co-deposition of up to four materials
- No awkward rod feed required

Applications

- Surface science
- Contact metallisation
- Nanostructured films
- Multilayers
- Alloy materials
- Doping
- Ultra-thin films.

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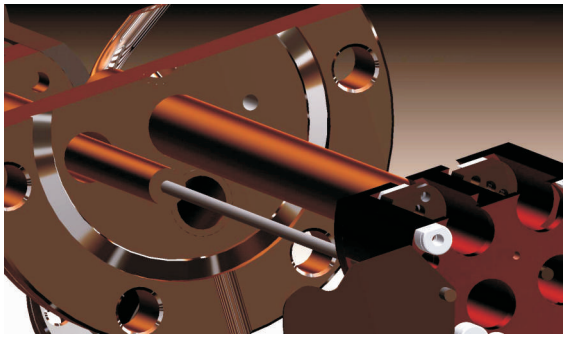
Quad-ev Evaporators

Electron-Beam Evaporation

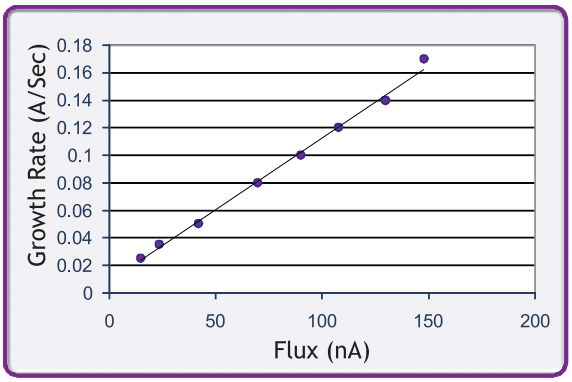
Electron beam evaporation is used to deposit materials difficult to evaporate with standard thermal techniques and in applications where high purity is required. An energetic electron beam is targeted onto the source material which allows an evaporation temperature in excess of 3000 degrees Centigrade to be achieved. Mini electron beam evaporators are employed to give maximum control of the evaporation rate at low fluxes and, importantly, to minimise contamination of the vapor stream for sensitive application areas such as surface science or thin-film doping. The construction of mini e-beam evaporators should therefore be aimed at maximising the evaporation control and minimising contamination.

EV-Series Construction



The MANTIS EV-Series mini e-beam evaporators are constructed from high-quality, strictly UHV-compatible materials. The mounting hearth for the source material(s) and the surrounding evaporation head are highly-efficiently cooled, ensuring a rapid heat transfer to the cooling water. This allows all but the emission filament and the source material to remain at near ambient temperature, ensuring negligible outgassing during operation.
Each pocket in QUAD sources uses independent filament, flux and high-voltage channels. The use of independent high-voltage channels ensures accurate power control and continued operation in the event of a material-related short-circuit in one pocket. This overcomes the problem seen in other evaporators with a common high-voltage channel where a problem in any one pocket renders the others inoperable.

Flux Monitoring



The graph above shows the relationship between deposition rate of molybdenum, as measured by a quartz-crystal monitor and the ion current (flux) measured on the flux-monitoring plate of a QUAD-EV-S source.

The sources are equipped with flux monitoring electrodes above each pocket to allow independent monitoring and regulation of the deposition rate.
This technique capitalises on the phenomenon whereby a small fraction of the vapour emerging from the evaporant is ionised and that this fraction shows a linear relationship with vapour pressure in the beam. Once calibrated, this ion current can therefore be used as an independent guide to deposition rate and is sensitive even at rates far below the sensitivity levels of quartz-crystal thin film monitoring devices.

Target Materials

All sources/pockets can be loaded with bare material in rod form (2mm for QUAD and M-EV sources and up to 4mm for QUAD-EV-HP) or with a crucible into which material can be loaded. The choice of crucible or rod is governed by a number pf parameters and Mantis will be glad to advise on the correct choice

Accessories & Options

Power Supplies

We supply three models of power supply:

QUAD-EV-S-PSU. A 250W single channel supply with four switcheable outputs. This can be used to power either single QUAD-EV-S or four M-EV sources (with optional interface-box).

QUAD-EV-C-PSU. A 250W four channel supply with the facility to independently enable and measure output from all channels. This can be used with the QUAD-EV-C source.

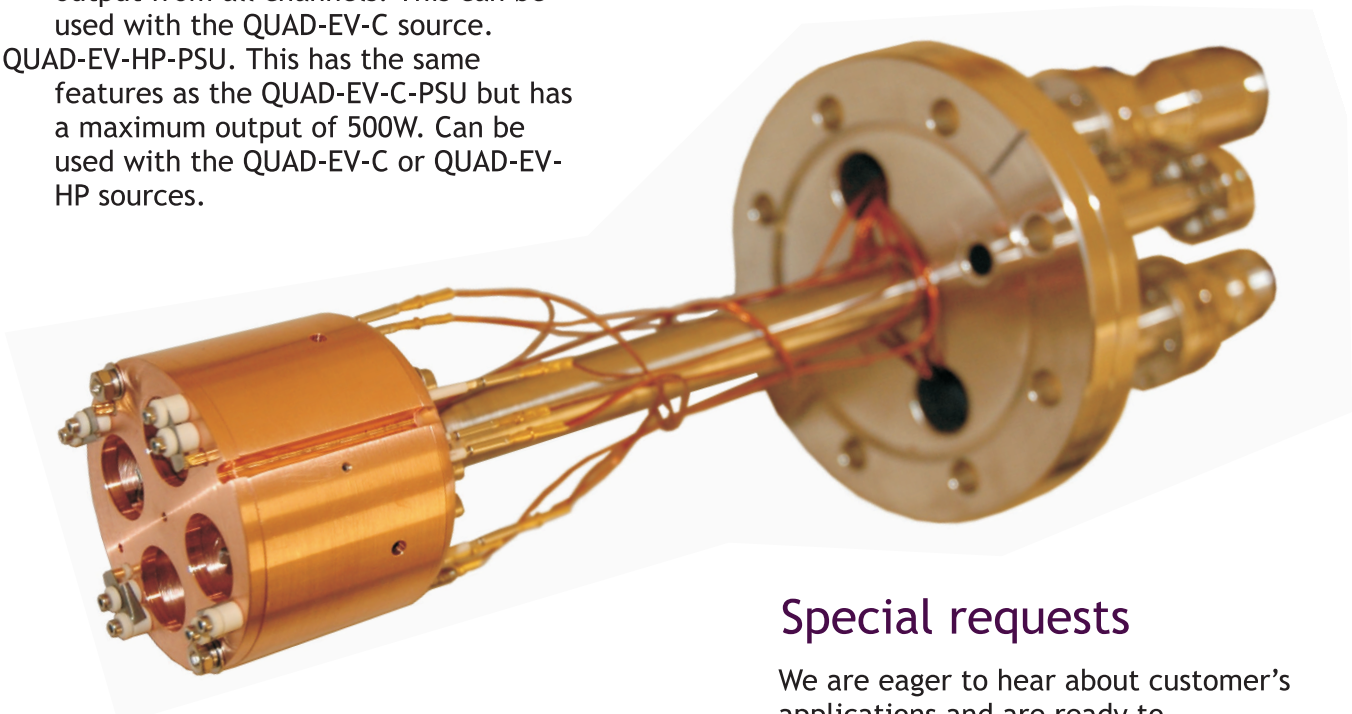
QUAD-EV-HP-PSU. This has the same features as the QUAD-EV-C-PSU but has a maximum output of 500W. Can be used with the QUAD-EV-C or QUAD-EV-HP sources.

Shutters

All sources can be supplied with manual or motor-driven shutters.
The QUAD-EV-C and QUAD-EV-HP sources are equipped with shaped shutter blades to allow up to seven combinations of open/shut pockets to be achieved.

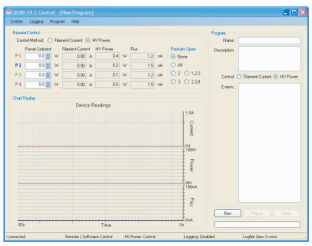
Crucibles liners

Each pocket can be equipped with crucibles or rods. Crucibles can also accept ceramic liners which are recommended for use with a number of materials. We supply a wide range of crucible options to cater for most materials and applications and will advise users on the right choice for a given evaporant.



Automation software

The QUAD-EV-C and QUAD-EV-HP power supplies can be driven by PC-operated control software. This enables full control and data-logging of all parameters as well as recipe-driven deposition sequences to be programmed.Note: software-driven shutter control requires the motor-driven shutter option.



Special requests

We are eager to hear about customer's applications and are ready to accommodate special requests if our standard sources will not immediately allow your goals to be met. For example, we can design unusual crucibles, modify source geometry and generate beam-shaping apertures.
We can also manufacture the source body from alternative materials for applications sensitive to certain contaminants such as copper.

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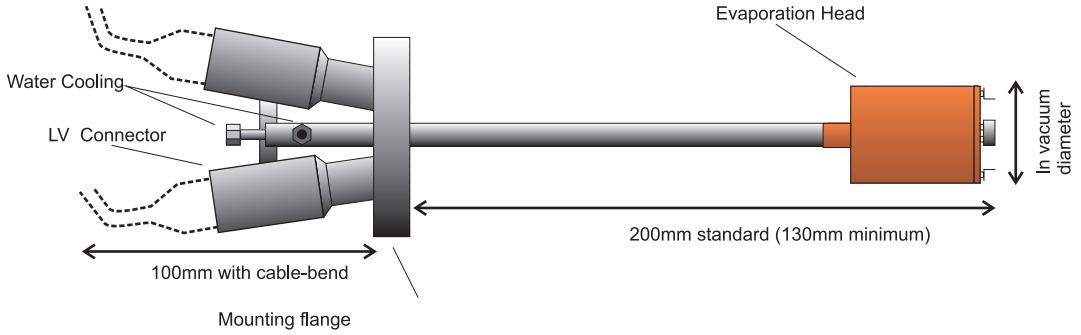
Specifications

QUAD-EV-S/C/HP



	M-EV	QUAD-EV-S	QUAD-EV-C	QUAD-EV-HP
Mounting flange	NW35CF	NW35CF	NW35CF	NW63CF
In-vacuum length	200mm (standard)	200mm (standard)	200mm (standard)	200mm (standard)
In-vacuum diameter	32mm	34mm	34mm	57mm
Pockets	1	4	4	4
Co-evaporation	No	No	Yes	Yes
Power	0-200W	0-200W	0-250W/500W	0-500W
Cooling	Water (0.5 l/min)	Water (0.5 l/min)	Water (0.5 l/min)	Water (0.5 l/min)

Utilities

Water: minimum flow 0.5 l/min. Clean mains water acceptable.
Power: M-EV/QUAD-EV-S: 360W. QUAD-EV-C: 600W. QUAD-EV-HP: 700W
Rack space: M-EV/QUAD-EV-S: 19", 2U. QUAD-EV-C/HP: 19", 3U
Standard cable length: 5m
Input: Single Phase, 100-240V, 50/60 HZ.

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