

VALVED ARSENIC CRACKER SOURCE VACS



VACS 63-300, valved arsenic cracker source with 300 cm³ crucible, cooling shrouds and motor drive

The Valved Arsenic Cracker Source VACS is designed for high performance growth of III-V materials.

The VACS is highly specialized for As₄ or As₂ sublimation and combines a large crucible capacity of 300 cm³ or 500 cm³ with precise and fast flux control. A flux control range of more than two orders of magnitude is provided by the integrated valve mechanism. The typical on/off ratio is about four orders of magnitude.

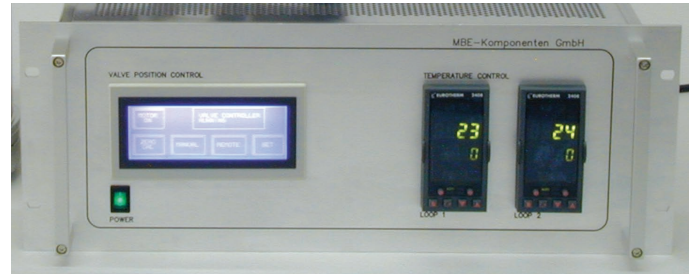
The VACS offers a relatively large valve opening which allows improved pumping of the As reservoir in open valve position.

The valve unit can be operated manually or with a valve control unit (MVCU, see overleaf) which controls the valve position by an external analogue voltage (0...10 V). The integrated water cooling shroud and the use of selected materials for cell and valve unit guarantee high purity operation conditions. The operation mode of the source can be easily changed from As₄ to As₂ growth by the operation temperature of the integrated cracker unit.

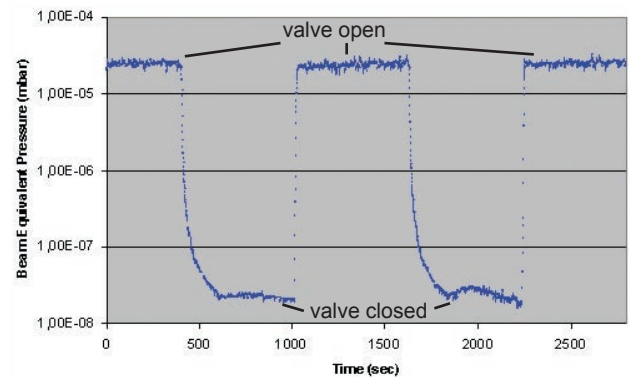
The special design allows an easy refilling of the crucible from the backside without removing the cell from the chamber. This simplifies your maintenance work and saves your time.

The typical valve characteristic, i.e. the beam equivalent pressure (BEP) as a function of the valve position, is shown on the right hand side. This smooth operation condition guarantees a precise and reproducible flux control for your application. Together with a high motor speed of 10 mm/s a fast control is reached.

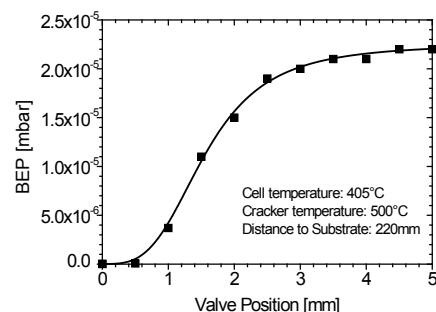
- Compatible with all MBE systems
- Capacity : 300 or 500 cm³
- Large valve opening
- Precise and very fast flux control
- Easy handling and refilling procedure
- Integrated water cooling shrouds



Control panel of the motorized valve control unit MVCU



Beam equivalent pressure vs. time, with valve closed/open



Beam equivalent pressure (BEP) measured as a function of the valve position

Applications

The VACS is used for As₄ and As₂ sublimation in III-V MBE. Large crucible capacity (300 cm³ up to 500 cm³), fast and precise flux control and easy handling for maintenance and crucible refill make the VACS ideal for smaller production MBE systems as well as for higher throughput research MBE systems.

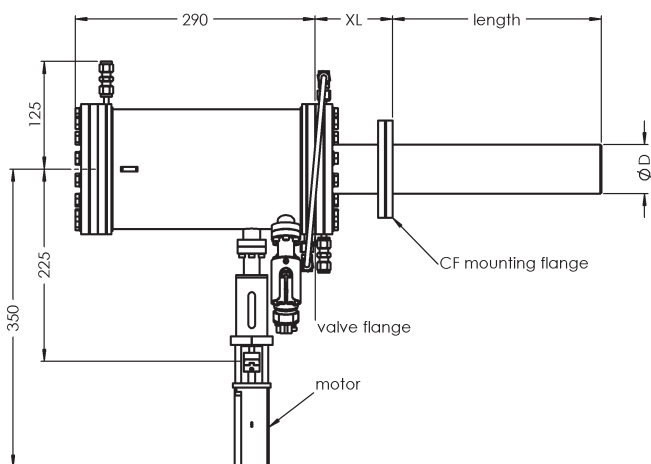
Motorized Valve Control Unit

The Motorized Valve Control Unit MVCU is designed for operating the valve of a valved source with a servo motor drive. Manual or remote control with 0-10 V analogue input signal is possible. The display indicates the linear position of the valve from 0 - 7.99 from fully closed to fully open position. The resolution is 0.01 mm per step. The automatic zero calibration guarantees a highly reliable and reproducible operation of the valve unit. The MVCU housing is compatible with the 19" rack system.

Technical Data

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|-------------------------------|---|
| Mounting Flange | DN100CF (O.D. 6") (DN40CF (O.D. 2.75") or DN 63CF (O.D. 4.5") with VADP adapter) |
| Heating system | 2 separate heater circuits (cell/cracker) |
| Thermocouple | 2 Type C W5%Re/W26%Re thermocouples (cell/cracker) |
| Bakeout temperature | 300°C |
| Operating temperature | cell crucible: 300-400°C; cracker: 450°C (As ₄ -mode) - 1100°C (As ₂ -mode) |
| Outgassing temperature | cell crucible: 500°C; cracker: 1200°C |
| Cooling | integrated water cooling shrouds |
| Crucibles | 300 or 500 cm ³ |
| Flux control | integrated valve unit |
| Valve control | hand control, or motor drive with control unit MVCU |

Schematic drawing of the Valved Arsenic Cracker Source VACS (Drawing shows VACS 100-300 with VADP adapter)



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