

# VAPBOX 4000

## > DLI\* CVD & ALD Vaporizer

High Performance, Compact, Precise, Innovative liquid and solid precursors Delivery and Vaporization System for ALD, CVD, MOCVD, PECVD, MLD and all gas phase processes.

The **VAPBOX 4000** vaporizes pure liquid compounds and solid ones dissolved in a carrier liquid (organic solvent) up to 250°C.

The **VAPBOX 4000** is able to handle and vaporize most of solid and liquid compounds including low vapor pressure, thermally labile and viscous ones.

The **VAPBOX 4000** provides high and unmatched performances based on a pulsed injection of a mixture of liquid and carrier gas. That pulsed injection is performed by a proprietary Injection Head (atomizer) and allows a very fine atomization of the liquid to be vaporized. The liquid is flash vaporized and the generated vapors can be used for the synthesis by ALD and CVD of thin films, multilayers structures, nanoparticles and nano-objects of numerous complex functional materials such as for instance multi-metallic oxides (high-k dielectrics, magnetic and superconducting materials, ferroelectrics, piezoelectrics), various chalcogenides (PCRAM and CIS/CIGS photovoltaic materials) and transparent conductive oxides (TCO).

Because of its unique proprietary way to deliver and atomize the liquid inside the vaporizer the **VAPBOX 4000** is able to achieve a real non-contact flash vaporization therefore generating particle free vapors.

Indeed, the blasting of the carrier gas/liquid mixture inside the vaporizer allows generating an aerosol of droplets around 10 microns in diameter. Such very small droplets can be easily flash vaporized. Competitors' vaporizers are generating bigger liquid droplets that cannot be flash vaporized and clog the vaporizer.

The **VAPBOX 4000** operates from vacuum to atmospheric pressure.

Thanks to delivering of accurate and stable liquid flows, the **VAPBOX 4000** delivers accurate and stable vapor flows.

The **VAPBOX 4000** can inject and vaporize up to 4 liquids or solutions simultaneously or sequentially.

\*DLI = Direct Liquid Injection

*US patent pending and patents pending in other countries*



## > Technical specifications

### Injection Heads (liquid inlets)

> 1 to 4

### ICU (Injection Control Unit)

> 24 VDC or 110-230 VAC remote and rackable 19" 2U unit (1 or 2)

### Heating:

> 6 heating zones, up to 250°C, 2400 W

> 7 K type thermocouples: (1 per heating zone + 1 alarm)

### Fittings:

> 1/8" compression type or 1/8" VCR male fitting for liquid inlet(s) (1-4)

> 1/4" VCR female fitting for carrier gas inlet(s) (1-4)

> 1/2" VCR male fitting for vapor outlet

### Versions:

> 230 VAC version and 115 VAC version

### Accessories:

> 1 Liquid flow controlling kit per Injection Head, including a Liquid Flow Meter (LFM)

> Liquid panel with 1 precursor tank per Injection Head and with an optional solvent tank

> Carrier gas panel with 1 carrier gas Mass Flow Meter (MFM) per Injection Head

> TCU (Temperature Control Unit): 19" remote and rackable 3U unit

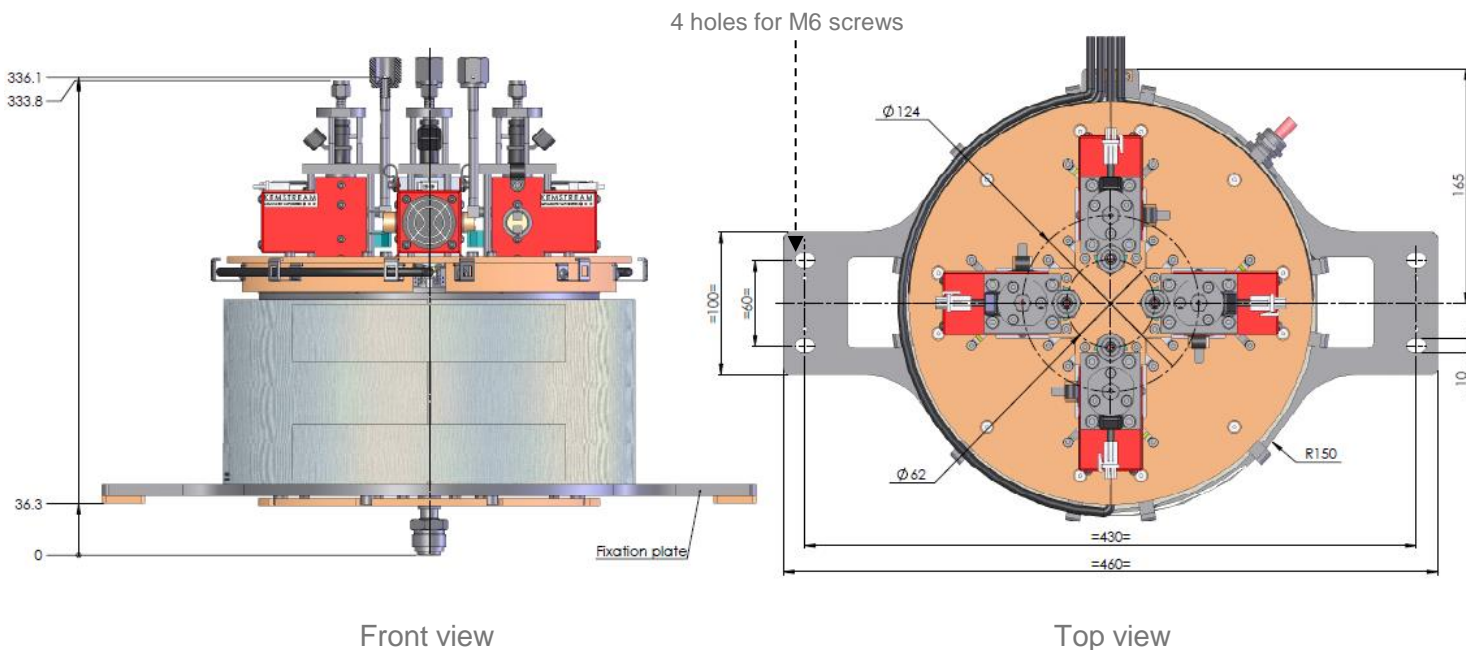
### Flows range (per Injection Head):

> Typical carrier gas flow range = 150 to 7500 sccm

> Typical liquid flow range = 0.1 to 15 g/min

> Dimensions (mm)

VAPBOX 4000 with 4 Injection Heads



Total weight is about 35 kg

> Ordering information

Injection Head

HB4	-	S2V	F4V
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Liquid inlet fitting

S2V	1/8" Swagelok
M2V	1/8" VCR male

Carrier gas inlet fitting

F4V	1/4" VCR female (standard)
M4V	1/4" VCR male
S4V	1/4" Swagelok
T4V	1/4" OD tube

Vaporizer

V40	HBRS1	M8	V
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Voltage (for heating)

HBRS1	230 VAC
LBRS1	115 VAC

Vapor outlet fitting

M8	1/2" VCR male (standard)
M4	1/4" VCR male
K1	KF16 mm
	other fittings upon request

Vaporizer pressure (process P)

V	from 0 to 1.5 bara
A	above 1.5 bara

If the vaporizer is equipped with only 1 or 2 Injection Heads, 1 ICU (Injection Control Unit) is needed.  
If the vaporizer is equipped with 3 or 4 Injection Heads, 2 ICUs are needed

For ordering information about the ICU please see the datasheet of the ICU

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