

Tailor-made vacuum

Compact diaphragm pumping units increase efficiency in chemical and pharmaceutical laboratories

The NT and Vario series chemistry pumping units have opened up numerous possibilities for more efficient and cost-effective vacuum processes. With a wide range of performance options based on different suction properties, ultimate vacuum as well as standard or Vario configurations, the manufacturer is able to offer tailor-made solutions for almost any vacuum application in the chemistry lab.

In view of the increasing scope of applications in today's modern chemical and pharmaceutical laboratories, this can often mean a wide range of equipment is required. With lab space and process time at a premium – and with multiple vacuum applications that typically include filtration, evaporation, drying, concentration, etc. each necessitating their own individual vacuum – more innovative solutions are called for to address these issues.

With this in mind, Vacuubrand's NT and Vario series therefore offer improved energy efficiency, enhanced environmental and user friendliness and more compact and space saving designs. The systems can also be adapted automatically to individual process requirements, thus integrating the vacuum process seamlessly into work routines and reducing the need for constant process monitoring and supervision. Owing to their unique design technology,

chemistry diaphragm pumping units already offer a high degree of economic, ecological and performance advantages: for one thing, they are oil-free and as such generate no contaminated waste oil. In addition, the modular, integrated system components allow simple solvent recovery and vacuum regulation.

The performance efficiency of chemistry pumps depends on their suction properties and final vacuum (also with gas ballast) as well as on the quality and consistent operation of the individual components.

Increased performance yet lower operating costs

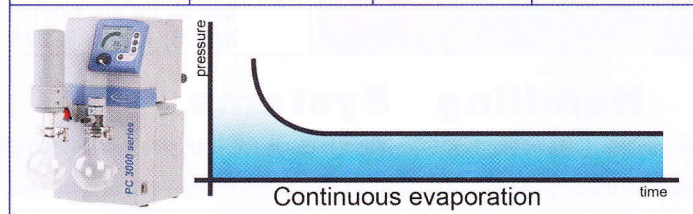
The NT pumping series (500, 600 and 3000) unveiled at Achema 2009 offers many improved features while maintaining the traditionally first-rate chemical resistance and

condensate compatibility. It also boasts an incredibly long life based on the special planar PTFE diaphragm in conjunction with Vacuubrand's stability core technology. All gas-contacting parts in the pump are made from a thick layer of highly chemically resistant, fluorinated plastic, surrounding a solid stability core. Vacuubrand consciously rejected the use of plastics such as PEEK at the heart of the pump, as experience has shown them to be unsuitable for many chemistry applications.

The result of all this technology is an excellent and consistent final vacuum, even with the gas ballast valve open, leading to outstanding performance and flexibility, if necessary with highly condensable vapours. It allows optimal evaporation of known high-boiling solvents (e.g. DMF) with shorter process times at lower temperatures. The NT pumps are amazingly quiet and have low vibration characteristics due to the patented flying-drive motor system. At the same time, servicing has been greatly simplified owing to the special cylinder head design consisting of separately removable valve islands for independent diaphragm and valve replacement. The fixed-speed NT chemistry pumping units (500 and 600 series) with their integral electronic vacuum control incorporate the benefits of traditional 2-point control, regulating the vacuum via an opening and closing solenoid valve.

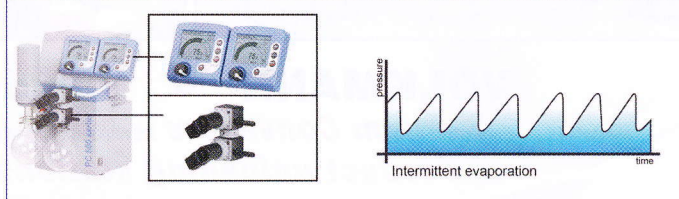
The PC 500 and 600 series are also available with dual vacuum connections to allow simultaneous operation of two independent vacuum processes, thus saving money, energy and space. Each vacuum outlet has an integral non-return valve that is designed to prevent cross contamination and backflow of gases and reduce the risk

Type	ultim. vacuum w/o gas ballast	ultim. vacuum with gas ballast	max. pumping speed
PC 3001 VARIO	2 mbar	4 mbar	1.7 m ³ /h
PC 3002 VARIO	7 mbar	12 mbar	2.8 m ³ /h
PC 3003 VARIO	0.6 mbar	2 mbar	2.8 m ³ /h
PC 3004 VARIO	1.5 mbar	3 mbar	4.6 m ³ /h



Technical data of the NT Vario chemistry pumping units, PC 3000 Vario series

Type	ultim. vacuum w/o gas ballast	ultim. vacuum with gas ballast	max. pumping speed	vacuum connection
PC 510 NT	7 mbar	12 mbar	2.0 m ³ /h	1x vacuum controller (CVC 3000), optional upgrade for second port
PC 511 NT	7 mbar	12 mbar	2.0 m ³ /h	1x vacuum controller (CVC 3000), 1x manual regulation, upgradable for second vacuum controller
PC 520 NT	7 mbar	12 mbar	2.0 m ³ /h	2x vacuum control (2x CVC 3000)
PC 610 NT	1.5 mbar	3 mbar	3.4 m ³ /h	1x vacuum control (CVC 3000), optional upgrade for second port
PC 611 NT	1.5 mbar	3 mbar	3.4 m ³ /h	1x vacuum controller (CVC 3000), 1x manual regulation, upgradable for second vacuum controller
PC 620 NT	1.5 mbar	3 mbar	3.4 m ³ /h	2x vacuum controller (2x CVC 3000)



Efficient parallel operation with PC 500 NT and PC 600 NT

of interference between the two outlets. The energy efficiency of the pumping system as a whole can be enhanced even further by using variable-speed pumps.

Fitted with variable-speed motors

The NT-Vario 3000 series of pumps and pumping units is fitted with variable-speed motors that automatically adjust the pumping performance according to demand.

The main advantages are:

- Lower energy consumption
- Whisper-quiet and vibration-free operation
- Unsurpassed diaphragm and valve life expectancy
- Automation for superior process quality, safety and productivity

Above all, this control technology with its automated vacuum regulation has a remarkable influence on the efficiency of the vacuum process. The complex samples to be dried (e.g. acetropic mixtures of solvents) can be handled faster and more safely with unprecedented reproducibility. The automatic and user defined programs allow fully automatic procedures at considerably lower cost. The actual influence of automated vacuum regulation on process efficiency largely depends on the vacuum regulation quality and the level of automation.

Both the manual and the traditional 2-point vacuum regulation methods are susceptible to problems with under- and overshooting of the vacuum, leading to foaming and boiling over the solvent mixture. In reality, only a few vacuum regulators work fully automatically. Many systems are not even able to recognise boiling pressure levels independently.

Vario pumps combined with CVC 3000 controllers

The Vario pumps in combination with the CVC 3000 vacuum controller are extraordinary in this respect in that they allow fully automatic control of the evaporative process with precise, single-point vacuum control (without hysteresis). As a result, the

evaporation always occurs under optimal conditions, thus typically reducing the process time by up to 30 %, corresponding to a 30 % increase in productivity. All in all, the Vario system is a logical choice whenever efficiency improvements, lower labour and energy costs and streamlined processing times are number one priorities.

This automatic function particularly comes into its own with rotary evaporation and parallel evaporation processes. Special, unique control algorithms reduce the risk of foaming or boiling delay, even with complex solvent mixtures. The controller is easy and intuitive to use and provides a choice between standard automatic functions or (if appropriate) individual control parameters.



The Vario and NT chemistry pumping units combine a compact design with maximum efficiency

The menu is configurable in 14 languages. All gas-contacting parts are made from chemically highly resistant materials. An integrated, capacitive ceramic vacuum sensor, plus an additional air admittance valve with inert gas connection, facilitates exact measurements of the process as well as ventilation with different media. In addition to the standard control options, the CVC 3000 controller also supports up to ten freely definable programs for customised and individual programming combining all the available functions if required. The user can change any of the set parameters at the touch of a button. The CVC 3000 is also self-configuring and automatically recognises all externally connected Vacuu Bus components, such as valves, sensors, I/O modules or NT Vario pumps. Communication is controlled by means of the Vacuu-Bus protocol. A bidirectional RS 232 interface serves as a link to other, associated process equipment/controllers.

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