



MMM Group

VACUCELL[®] EVO

Vacuum drying oven with automatic temperature and vacuum control

NEW



Innovative Heat Technology



protecting human health

Tradition, Quality, Innovation

Since its establishment in 1921, BMT Medical Technology s.r.o., the traditional manufacturer of medical and laboratory technology, has been gradually transformed from a small regional company to an international corporation.

In 1992, it became a member of the European MMM Group which has been operating on the world markets since 1954 as an important supplier of systems for the health care industry, science and research. With its comprehensive offer of products and services, sterilization and disinfection devices for hospitals, scientific institutes, laboratories and pharmaceutical industry, MMM Group has established itself as an outstanding quality and innovations producer on the global markets.

The knowledge and experience gained during the implementations of individual supplies for our customers all over the world, and the technical innovations have been permanently and positively influencing the development, construction and production of our devices. High level of our work has also been confirmed by the number of patents and industrial designs as well as an easy implementation of individual device adjustments.

MMM Group – excellence in medical and laboratory technology.

Basic Characteristics

- Inner volume: 22, 55, 111 litres
- Temperature range: from 5°C above ambient to 250/300°C
- Door window
- Access port Ø 40 mm with shell outlet
- Inert gas connection
- Large-surface door overpressure valve "Ventiflex"
- Inner chamber:
 - stainless steel DIN 1.4571 (AISI 316 Ti)
 - Aluminium shelves Servotherm with direct heat exchange (conduction) system

VACUCELL® EVO

Vacuum Drying Oven with Automatic Temperature and Vacuum Control

The VACUCELL® device is designed for perfect drying of materials, parts and samples up to constant weight, in vacuum, with possible protective atmosphere in inert gas. The VACUCELL® line is characterised by noise-free operation and fine heating and it offers equal and safe drying of thermo-labile, oxidation-sensitive or powder materials in laboratories, as well as shape-complicated products with many holes and threads in industry. The device offers high service comfort and exact regulation of temperature and vacuum and that is why it is suitable even for demanding and exact tests and processes. The device can be implemented in pharmaceutical, cosmetic, chemical, electro technical, petrochemical, air and tobacco industries, in the field of redevelopment technologies, space research and manufacture of health and medical means. On request, the device can be completed with a "Vacustation" base, with or without selected vacuum pump type. The devices of the VACUCELL® line meet the requirements of technical and legislative regulations in the CR and EU as well.



Applications



Pharmaceutical Industry

Drying of primary materials and finished products without air access.



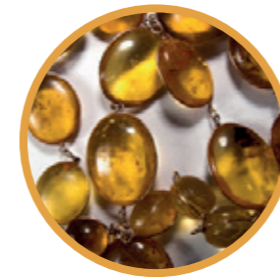
Cosmetic Industry

Extraction of scent concentrates for perfumes production



Redevelopment Technologies

Low-temperature drying of devices and electronic components, archive paper prints after natural disasters (like floods, fire extinguishing with water).



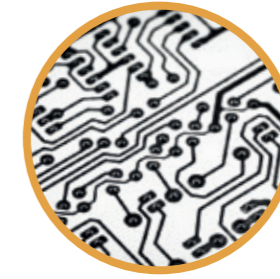
Petrochemical Industry

Division of hydrocarbons, drying of temperature – instable resins and solvents under lower temperatures in vacuum.



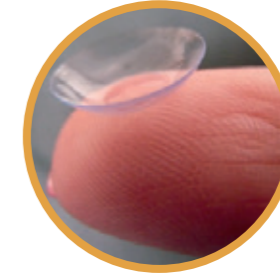
Aerospace Industry

Fine drying of precise components of titan and duralumin after washing, before assemblage in clean premises, drying of rocket fuels components without oxygen access.



Electronic Industry

Low-temperature drying of electronics boards at 80°C.



Manufacture of Health and Sanitary Means

Testing of contact lens, low-temperature drying of primary materials for implants.



Plastic Processing Industry

PET analyses, nano-compounds obtaining.



Chemical Industry

Fine drying of labile compounds without oxygen access.



Tobacco Industry

Drying of tobacco samples in quality control laboratories.



The New Control System Offers

- 5.7 inch (14.5 cm) touch screen display
- Microprocessor Fuzzy logic process control
- Intuitive control via colour icons
- Graphic configuration of a new program
- Transparent displaying of data course at the cycle
- Protective thermostat class 3
- Acoustic and visual alarm
- Multi-level users administration (corresponding to FDA 21 Part 11)
- Keyboard lock against unauthorised handling
- Data encryption and non-manipulability (corresponding to FDA 21 Part 11)
- Up to 100 programs and up to 100 segments for each program
- Yearly data logger in graphic and numeric form
- On-line or off-line data export
- Prepared service programs for fast diagnostics of faults
- Easy service diagnostics including remote access
- Multi-language communication
- Printing of protocols in PDF format via Warmcomm 4.0
- Easy user configuration of the device
- SD memory card, USB Host and RS 232 standardly included
- WIFI connection, USB device or Ethernet interface with own IP address for remote data transfer, control and diagnostics (optional equipment)
- Programming of ramps, real time and cycling
- Main ON/OFF switch for security reasons
- Device state LED indicator

Connectivity



Data Output

Thanks to use of state-of-the-art electronic components, the VACUCELL® EVO device has no limitations in data peripherals connections. The basic configuration contains the traditional and reliable interface RS 232, USB Device and an SD card as a data carrier. The device can be easily completed with a Wi-fi module 802.11b/g with up to 100 meters reach, there is also available the USB Host port two-directional USB communication and the Ethernet (RJ 45) interface for remote connection. The proper IP address allows easy connection to a PC or selected printer, respectively other ordinary data peripheral (Smartphone, Netbook, etc.). Thanks to open platform and adjusted data format it is also possible to configure remote connection and with data online, in remote mode (Internet).



WarmComm 4.0

Universal Data Administration with Devices of the MMM Group



- connectible to all the devices of the MMM Group
- stable platform of the SQL library
- user-friendly environment
- Connection via the Ethernet to unlimited number of devices via RS 232,USB, then limited by the number of PC ports
- bilateral communication – data monitoring and device control
- compatibility with older lines of heat technology devices
- Client-Server architecture
- service module for local and remote diagnostics
- three levels depending on client's requirements (B-P-F)
- compliance with FDA CFR 21 Part 11 (version F)
- web support, on-line updates
- protected licence policy
- unpretentious to HW requirements, compatible with MS Windows
- validation documentation IQ/OQ



VACUCELL® EVO

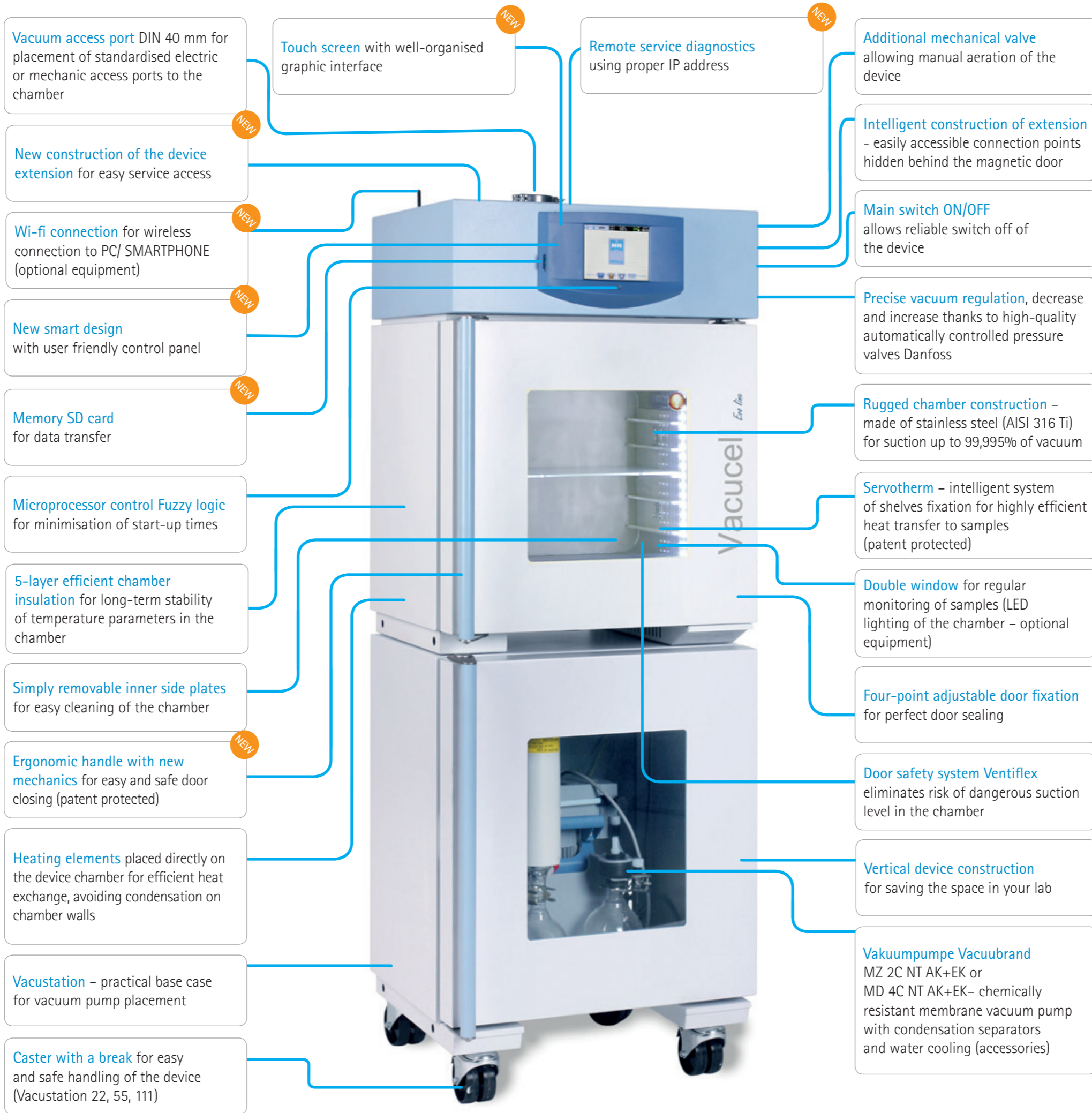
Comfortable Device with Excellent Parameters

MMM Group traditionally offers a wide range of case sizes, from the smallest volume of 22 litres up to 111 litres, with the best price to performance ratio. The patented system of shelves placement with direct heat exchange Servotherm provides fast heating of samples and uniform space distribution of temperature.

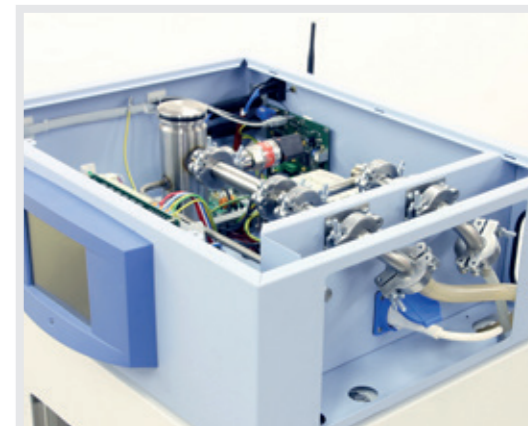
Extensive experience of our engineers and many years of careful development of regulation SW contributed to unique control system Fuzzy logic. The Fuzzy logic is used for continuous assessment of process values, like chamber size, pre-set program parameters, number of samples inside the chamber and then, the heating performance and vacuum control is optimised.

Rugged construction of stainless steel chamber and door fixed in four points, with safety system Ventiflex, completed with armed glass allow tests even under extremely low vacuum.

Practical, large and well-proved handle, rugged braked wheels of the optional Vacustation case and main door openable up to 220° support very user-friendly character of the device. The combination of light grey and light blue colour, highlighted with a dark blue smiling control panel, establish everyday harmony feelings of the users.



Main Switch and Data Interface



Well-organised service space with accessible connection points



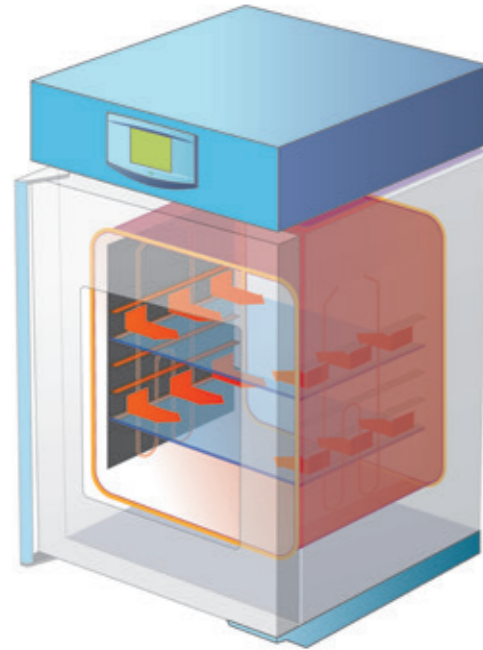
Simply removable inner sides of the chamber

Patented System of Heat Transfer by Direct Conduction Servotherm

Fast and uniform heat transfer to samples under any pressure conditions is the basic parameter of every vacuum drying oven. Another key element is the whole chamber heating, so as to avoid residual steams condensation on chamber walls.

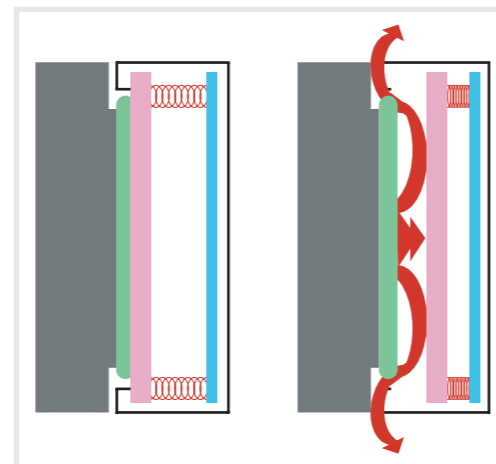
Our designers developed a simple but intelligent system of shelves fixation in the chamber, meeting the parameters of fast heat transfer under low production costs.

The shelves do not include any heating elements or electric connectors and that is why they can be easily removed without functionality limitation caused by damaging of electric elements inside of the chamber. Everything is placed outside the chamber. The stainless steel chamber is heated by powerful heating elements, fixed on external surface of the chamber. The heat passes through the chamber material and heats its complete inner surface. Aluminium shelf carriers set to inner wall of the chamber absorb significant portion of heat thanks to contact with the chamber surface. Thanks to large contact surfaces and their own weight, the precisely manufactured aluminium shelves create ideal conditions for heat transfer to the material of the shelves and in case of high temperatures they arrange sufficient dilatation of shelves discouraging thermal deformations. Sufficiently thick body of the shelf then distributes the heat in its whole surface and it is prepared to transfer heat to the samples in the chamber. The unique solution, which is highly demanding for exact workshop processing only, is simultaneously easily demountable for cleaning and it is ready for adding or removing shelves depending on current needs of the user. Simultaneously, the solution prevents development of cool spots in the chamber and avoids risk of condensation and samples contamination. The shelves are made of high-quality brushed aluminium, allowing extremely fast heat transfer. In case of aluminium corrosion risk in aggressive environment we recommend ordering of a stainless steel set (shelves + side walls) instead of the aluminium set for the chamber.



Door Safety System Ventiflex with Large-Surface Overpressure Valve

The door construction of all the MMM/BMT drying ovens meet all and any safety regulations of the EU. The four-point door fixation to the shell, patented traditional system of two door locks with a large handle and an inner panel of the door fixed independently on the door shell – these are the elements supporting excellent ergonomics of daily device door handling and while respecting the manufacturer's instructions they arrange maximal safety of drying and samples heating. But anyway, under some circumstances there may occur an undesirable reaction of samples with air oxygen and development of intensive overpressure in the chamber. In case of such an overpressure occurrence, VACUCELL® represents a unique solution exceeding standard safety limits. An inner panel of stainless steel frame and 2 cm thick armed glass is mounted on the door body using four guide rails and four strong springs. In case of undesirable overpressure in the chamber, the four strong springs release the armed glass panel from its position on the sealing in the chamber and they allow excessive gas release to the atmosphere. In this way, there is completely eliminated the risk of further accumulation of pressure in the chamber and



• Sealing • Armed glass • Door body
• External door shell

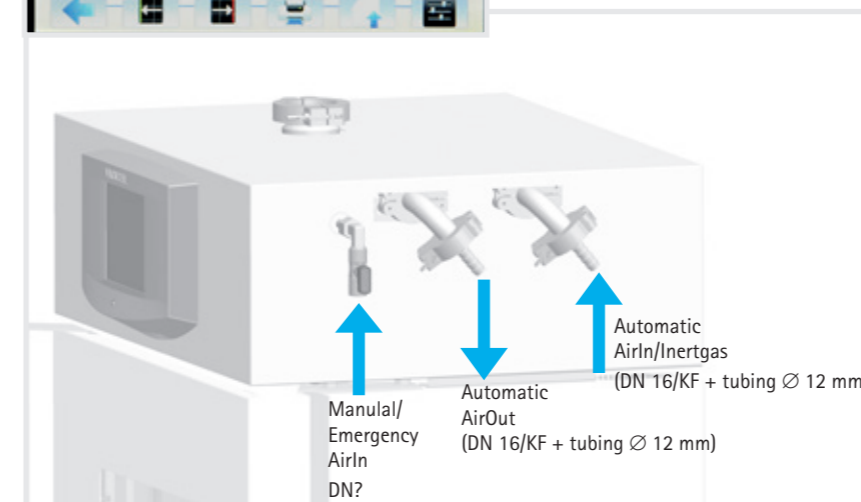
possible explosion causing the device deformation. In this way, the inner panel creates a large-surface overpressure safety valve. In the course of standard work, the armed glass perfectly seals on special silicon sealing of the chamber and so it develops conditions even for work in extreme vacuum

with low pressure loss. Another advantage is the fact that the user may use such a constructed door window, protected from the outside by hardened acrylic glass for samples monitoring. The window may optionally be equipped LED lighting of the chamber, switched by touch chip directly on the window surface.



Automatic Pressure Regulation

The new VACUCELL® EVO device is equipped with automatic pressure regulation system. According to user-set program configuration, the microprocessor-controlled automatics controls two precise pressure valves Danfoss. In this way, the system allows highly precise pressure decrease (negative regulation) or pressure increase (positive regulation) in the chamber. These cycles may be repeated as needed and – together with temperature regulation – there may be set any pressure and temperature conditions. For example, after heating up it is possible to repeatedly dry the industrial samples with complex hollows, to dry pharmaceutical material on exact pressure level or to use a pressure ramp to slowly aerate dried powder materials. In the device configuration, it is also possible to setup monitoring of any safe limit of heating depending on vacuum reached for concrete chemical substances. If it is necessary to heat material in inert atmosphere, just connect the device to input valve (IN) for inert gas intake and the control system of the device will keep the inert atmosphere for the whole time of the cycle duration. Each device configuration also includes the possibility of pressure regulation hysteresis adjustment, i.e. a regulation range within which the device will keep the pressure level in the chamber during tests under constant pressure – e.g. 10 mbar +/- 5 mbar. If it is necessary to interrupt drying of samples, it can be done



semi-automatically directly from the control panel or manually, using an additional valve to aerate the chamber and open the door of the device.

Vacuum Sources

Vacuum drying oven needs a vacuum source. The vacuum pump (vacuum source) is not included in basic equipment of the device. The device delivery includes two stainless steel flanges DIN 16 with an extension (Ø 12 mm) and flexible silicon hose, length 2,5 m. Suction in the chamber can be reached using any available vacuum pump that must be installed in such a way that it is connected to the outlet extension of the vacuum pump and simultaneously to the built-in socket in the device (voltage 230 V or 115 V according to nominal voltage of the drying oven). In this way, the automatics of the device may actively monitor the pressure level in the device chamber and – depending on configuration – reduce vacuum pump wear and tear by continuous switching on and off. But naturally, the central source of vacuum in a lab (if available) can also be used as a vacuum source. In this case, the device will regulate the vacuum level in the chamber through the automatic valve only.

Recommended vacuum pumps Vacuubrand (accessories)



Diaphragm vacuum pumps for chemical substances manufactured by VACUUBRAND are designed for use in labs while working with chemical substances. Their construction with fluoropolymers makes them very resistant to chemical vapors from inlet to exhaust and very tolerant to condensates. Our two-, three- and four-stage pumps also have a gas ballast valve that provides continuous purge with minimal impact on ultimate vacuum when working with condensable vapors. Pumping chambers are hermetically separated from the drive system ensuring long lifetimes of mechanical parts. Most importantly, diaphragm pumps are oil-free, for vastly reduced service demands compared with oil-sealed pumps. They eliminate the cost of water and its contamination well-known from water-jet aspirators, and the waste-oil disposal of rotary vane pumps. Typical applications are rotary evaporators, vacuum concentrators and vacuum drying ovens. The separator at the inlet (AK), made of glass with protective coating, retains particles and liquid droplets. The waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling, and active protection of the environment.

Performance features:

- outstanding chemical resistance and superior vapor tolerance
- high performance even at low vacuum levels
- optimized vacuum even with gas ballast for condensate purge
- whisper quiet and very low vibration
- excellent environmental friendliness due to efficient solvent recovery



Vacuubrand MZ 2C NT AK+EK (2,0m³/h, attainable vacuum 7 mbar)



Vacuubrand MD 4C NT AK+EK (3,4m³/h, attainable vacuum 1,5 mbar)

Accessories Included

Each VACUCELL® EVO device is delivered with standard equipment that does not have to be additionally ordered and it is included in the delivery:



Communication ports RS 232 and USB Host



SD card



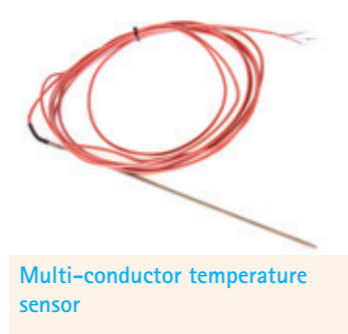
System Servotherm including Al shelves and Al sides (side plates)



Safety system Ventiflex



High-strength stainless steel chamber AISI 316 Ti



Multi-conductor temperature sensor



Door window



Automatic vacuum regulation, including two flanges DIN 16 and silicon hoses (Ø 8x18mm)



Manual/emergency aeration valve



Socket for vacuum pump connection and control

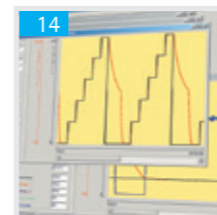
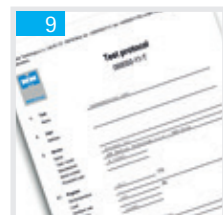
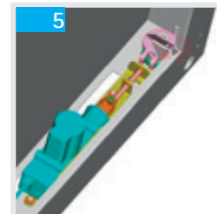


Universal stainless steel access port DIN Ø 40 mm

Optional Equipment

Thanks to modular construction of our device, VACUCELL® EVO may be additionally equipped with many additional options depending on your preferences.

- Flexible temperature sensors
- Set of sides and shelves – stainless steel AISI 316 Ti
- Extended data module: USB Device, Ethernet and Wifi interface
- Mechanical door lock
- Electromagnetic door lock
- Servotherm shelves (Al or stainless steel)
- Programmable inner socket
- External printer
- Multi-point temperature measuring
- Protocols IQ/OQ
- Vacuum pumps Vacuubrand MZ 2C NT AK+EK, MD 4C NT AK+EK,
- Vacustation – base case
- Inner lighting of the chamber
- Software WarmComm 4.0



Technical Parameters

VACUCELL® EVO (VU EVO) 22, 55, 111					
Technical data Internal space – chamber, stainless steel DIN 1.4301 (AISI 316 Ti)	volume	Approx. l	22	55	111
	width	mm	340	400	540
	depth	mm	260	320	410
	height	mm	300	430	480
External dimensions (including door and handle, feet)	width	mm	560	620	760
	depth	mm	500	560	650
	height	mm	780	910	960
Package – dimensions (three-layer carton)	width	mm	510	990	990
	depth	mm	690	830	830
	height (incl. palette)	mm	870	1300	1300
Weight	nett	Approx. kg	68	101	133
	brutt	Approx. kg	91	186	218
Shelves	shelves	max. No.	5	7	8
	standard equipment	psc.	2	2	2
	min. distance between screens	mm	40	47	47
	storage area	mm	280x236	340x296	480x386
Maximal load	for a shelf	kg	20	25	25
	total inside of device	kg	35	45	65
Number of outer metal doors		psc.	1	1	1
Electrical data	max. power	W	800	1200	1800
	mains 50/60 Hz	V	115/230	115/230	115/230
IP Code			IP20	IP20	IP20
Temperature data					
Working temperature	from 5°C above ambient	to °C	250	250	250
Temp. deviations acc. to DIN 12 880 from working temperature (Al racks, pressure 5–10 mbar)**)	in space at 100°C	± °C	2	2	3
	in space at 200°C	± °C	5	6	7
	in time	± °C	0,4	0,4	0,4
Temp. deviations acc. to DIN 12 880 from working temperature (stainless racks, pressure 5–10 mbar)**)	in space at 100°C	± °C	10	10	11
	in space at 200°C	± °C	18	23	*
	in time	± °C	0,5	1	1
Time of rise onto 98% voltage 230 V – Al racks, pressure 5–10 mbar	onto temp. 100°C	min	60	65	110
	onto temp. 200°C	min	80	86	130
Time of rise onto 98% voltage 230 V – stainless racks, press 5–10 mbar	onto temp. 100°C	min	130	140	170
	onto temp. 200°C	min	170	180	220
Heat emission	at 100°C	W	150	260	370
	at 200°C	W	300	520	750
Vacuum connection	vacuum connector	DN mm (KF)	16	16	16
	max. attainable vacuum	mbar	<5·10-4	<5·10-4	<5·10-4
	chamber leakage	mbar.l.s-1	<5·10-3	<5·10-3	<5·10-3
Measuring access port		DN mm (KF)	40	40	40
Connection (including hose terminal Ø 12 mm)	for inert gas or air	DN mm (KF)	16	16	16

Note: All technical data are related to 22°C ambient temperature and ± 10% voltage swing (if not specified).

*) Not measured

**) Heat transport to sample in shelves under vacuum is performed through shelves leads; that is why the above stated temperature variations apply to temperatures on shelves surfaces; the measuring sensors must be in perfect heat-conductive contact with the shelf surface. Samples placed on shelves must also be in perfect contact with shelves, the temperature of samples depends mainly on their physical characteristics and on contact with the shelf.

The values may differ depending on specific charge and media parameters.

Change in the design and make reserved.

Make Acquaintance With Our Further Offers ...

Unique Line... Cell



Designation	Type marking	Laboratory case type	ECO line	EVO line	Linie Standard	Linie Comfort	Natural air circulation	Forced air circulation	Temperature range in °C (Optional equipment)	Volume 22 (l)	Volume 50 (l)	Volume 55 (l)	Volume 111 (l)	Volume 190 (l)	Volume 222 (l)	Volume 404 (l)	Volume 707 (l)	Volume 1,212 (l)	
			•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•
drying, tempering, sterilization	ECOCELL®	drying oven	•	•	•	•	•	•	5*-250/300	•	•	•	•	•	•	•	•	•	•
	DUROCELL	drying oven with protective layer of inner space EPOLON	•	•	•	•	•	•	5*-125	•	•	•	•	•	•	•	•	•	•
	VENTICELL®	drying oven	•	•	•	•	•	•	10*-250/300	•	•	•	•	•	•	•	•	•	•
	STERICELL® ***	hot-air sterilizer	•	•	•	•	•	•	10*-250	•	•	•	•	•	•	•	•	•	•
	VACUCELL®	drying oven with vacuum	•	•	•	•	•	•	5*-250/300	•	•	•	•	•	•	•	•	•	•
incubation	INCUCELL®	incubator / biological thermostat	•	•	•	•	•	•	5-100	•	•	•	•	•	•	•	•	•	•
	INCUCELL® V	incubator / biological thermostat	•	•	•	•	•	•	10-100	•	•	•	•	•	•	•	•	•	•
	FRIOCELL®	incubator with cooling	•	•	•	•	•	•	0-100 (-20)	•	•	•	•	•	•	•	•	•	•
	CLIMACELL®	incubator with cooling and controlled humidity	•	•	•	•	•	•	0-100 (-20)	•	•	•	•	•	•	•	•	•	•
	CO2CELL**	incubator with CO ₂ atmosphere	•	•	•	•	•	•	5*-50	•	•	•	•	•	•	•	•	•	•

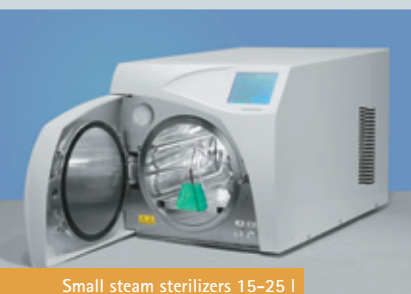
The above stated technical data apply and they are valid at the temperature of 22°C and voltage oscillation ±10%.

* above the exterior temperature

** manufacturer MMM Medcenter Einrichtungen GmbH, Semmlewisstrasse 6, D-82152 Planegg / Munich, tel.: +49 89 89 92 26 20, e-mail: medcenter@mmmgroup.com

*** the STERICELL® line also meets the Directive No. 93/42/EEC, the product is presented in a separate leaflet 0123

Make acquaintance with our further offers...



Small steam sterilizers 15-25 l



Steam sterilizers 140-1,490 l



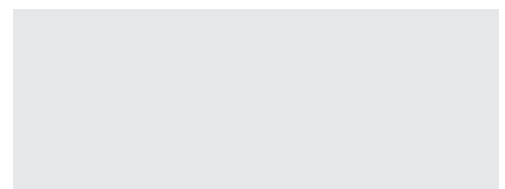
Steam sterilizers 70 l



Hot-air sterilizers 400-3,900 l



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