Some like it hot . . .

Vötsch
Industrietechnik

Heating and drying ovens VTU
Chamber drying ovens for coating materials VTL

Reproductive production results . . .

Units and systems by Vötsch Industrietechnik – Advantages at a glance

- Intensive and uniform temperature distribution in the chamber. All products are exposed to the same temperature conditions irrespective of their shape and size.
- Easily accessible maintenance provisions guarantee shortest service times.
- Low temperatures and low power consumption due to external wall insulation and high thermal decoupling of the inner and outer housing.
- Reliable and trouble-free operation through the use of high-quality components.
- Comprehensive technical documentation.
- The devices and systems comply with the latest technology and the current standards.
- High flexibility in the standard and customised production range. Thus we are able to uniquely respond to the needs of our customers.

VTU 75/100 – 250 °C GMP

Automobile Technology

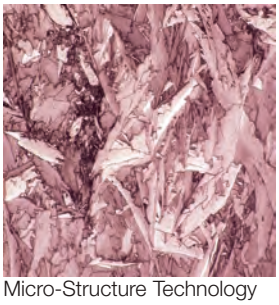
Mechanical Engineering

Electricals/Electronics

Aerospace

Plastics Technology

Pharmaceutical



Micro-Structure Technology

Chemistry

Micromechanics

Textile/Fiber

Metal,
Alloy Processing
Surface Treatment

Glass/Ceramics/Optics

Wide range of applications . . .

- Automobile Technology
- Chemistry
- Electricals/Electronics
- Micromechanics
- Glass/Ceramics/Optics
- Plastics Technology
- Aerospace
- Mechanical Engineering
- Metal, alloy processing
- Micro-Structure Technology
- Surface Treatment
- Pharmaceutical
- Textile/Fiber
- and other

. . . by innovative product ranges

Flexible solutions . . .

Vötsch Industrietechnik have proven once again that even perfected and reliable products can be further developed to reach a greater standard of perfection. The new generation of units is available in 7 model sizes and can be supplied with a working chamber of between 200 and 8000 litres and nominal temperatures of 400 °C.

These robust drying ovens are suitable for variety of heating and drying processes in production and research.

The reliable module construction and the extensive range of accessories available allow them to be employed for a variety of applications.
Modern control and monitoring systems, in conjunction with S!MPATI* software specially developed for these units, offer the possibility of linking up to 99 devices, if desired, and simultaneously controlling, monitoring and documenting there production results with a PC.

The principal advantages . . .

Process characteristics

- Short process duration due to high volume of circulating air
- Short recovery time due to automatic switch-off of heating and circulating air fan when door is opened
- Homogenous temperature distribution, thanks to directed air ductwork
- Reproducible production results by high quality standards
- Application-orientated air ductwork, both horizontal (standard) and vertical (optional)

Production characteristics

- Economical and environmentally friendly, thanks to the enhanced thermal insulation
- Optimum thermal separation of inner and outer casing
- Minimum loss of energy and effective operator protection when coating, thanks to the heating and circulating fan being switched off

A high degree of safety, thanks to:

- Low external wall temperatures
- Safety temperature limiter (protects units)
- Standard temperature selection limiter (for VTL)
- “Cold” heating connection
- Service and maintenance friendly
- All heating and drying ovens naturally comply with EMC guidelines.

Heating and drying ovens VTU . . .

Heating and drying oven (VTU 75/100) system.

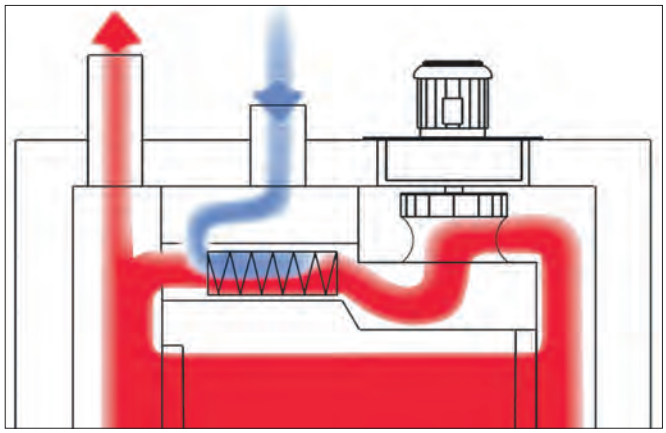
These heating and drying ovens **type VTU** are suitable for all applications in process where **no combustible solvents** are released.

Heating and drying oven VTU 60/60

The basic equipment

- Nominal temperatures 250/300/350/400 °C
- Outer casing made of galvanized sheet steel, coated with RAL shade 9002 (grey-white)
- Corrosion-resistant inner casing made of aluminised sheet steel
- Low external wall temperature and minimal loss of energy due to high-quality, generously dimensioned thermal insulation
- Grid rails in working chamber, facilitating height adjustment of wire-mesh shelves and grates
- The temperature-resistant door gasket is easily exchanged
- Door of walk-in units can be opened from inside (from model size 75/100)
- Tubular heating elements made of stainless steel
- Safety temperature limiter (protects unit)
- Microprocessor-based temperature control with solid state relays ensure minimal control fluctuations
- Control panel with additional display and control elements which can be upgraded, thanks to its modular construction
- Exemplary air ducting system which enables an incredibly even temperature distribution to be achieved, even with a fresh air supply. The air in the working chamber is mixed in this system with fresh air sucked in via a heating register, mixed by the circulating air fan and conveyed once more to the working chamber.
- Air exchange via air intake and exhaust flanges. Air intake flanges (VTU) are closed by delivery.

Air ductwork



. . . chamber drying ovens VTL

Drying combustible solvents

Processes which involve drying of surface coatings, mould and impregnated resin varnishes can lead to the air being enriched by released substances (e. g. solvents), forming an explosive compound. If a source of combustion is present at the same time it can lead to an explosion.

As per EN 1539:2009

Play it safe at all times

The **VTL series** from Vötsch Industrietechnik enables you to safely control these heating and drying processes by limiting the quantity of solvent involved. The chamber drying ovens VTL comply with the extented safety requirements of EN 1539:2009.

A circulating air fan with an improved performance ensures that a thorough mixture is achieved, thus preventing enrichment through solvent concentrations. A defined volume of hot air is continually conveyed outwards through the exhaust air fan and replaced with fresh air (dilution principle), thus preventing the formation of potentially explosive compounds.

To enable efficient operation to be achieved, the exhaust air volumes can be reduced to 25 % by switching off the exhaust fan when the main evaporation is completed.

The circulation and exhaust air volumes are monitored. Flow monitors switch off the heating immediately and permanently in the case of malfunctions (at a level lower than the required volume flow).

All the terminal connections of the individual components are caulkwelded in the inner casing to prevent the ingress of solvents into the thermal insulation and the resulting enrichment.

The permissible quantity of combustible substances depends mainly on the field of application of the drying oven.

There are different technical safety devices. Please contact us for a proposal of the best and most favourable solution for your special application.

Operation, control . . .

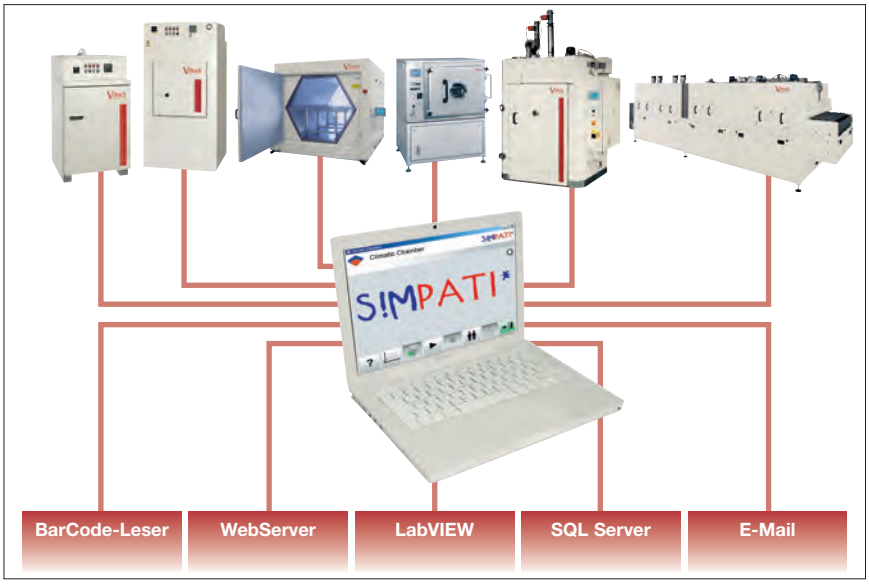
Operation and control with S!MPAC*

Special Features

- Convenient input of process values and program operation via a colour touch panel and a graphical display
- Program memory for up to 100 programs, with a total of 1,000 interfaces
- Two-stage password protection, against non-authorized access
- Integrated monitoring system for temperature
- Ethernet interface RJ 45 connector

- Operating and fault messages are displayed on the color touch-panel
- Built-in Web server for handling and monitoring in the browser
- Vötsch software package S!MPATI* is PC compatible for convenient management and archiving of records
- Special user interface for use in a production environment (simplified start/stop processes).

Vötsch software package S!MPATI* for PC . . .



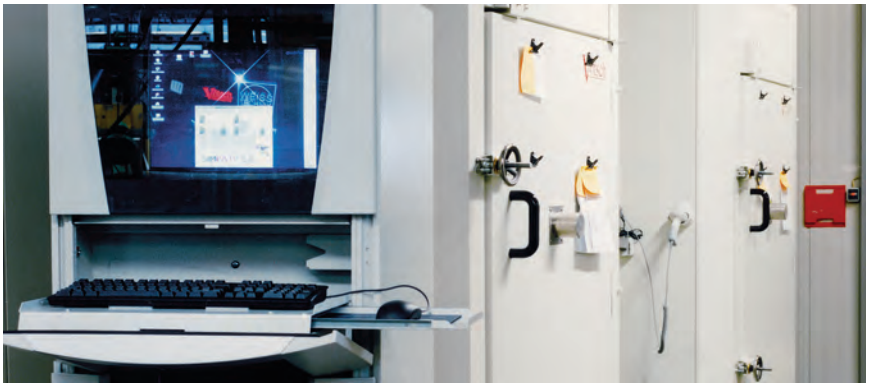
Vötsch S!MPATI* software is capable of complete documentation and graphical analysis.

With an optional installation of the software on your PC or laptop, the user can create profiles for Windows application and document all process parameters. The full power of the PC can be simultaneously experienced on the Windows.

Complete traceability of the production process with BarCode-reading technology

Benefits of the software

- Up to 99 units can be networked
- Programming and selection of programmes for automatic processes; no costly programming required
- Documentation, visualisation and managing of process data
- Access via PC network and your Internet Browser
- Transfer of messages via email to an existing mail server (SMTP)
- Reads programmes, production data (product, operator, unit) via **bar code** (optional)



Microprocessor-based temperature and program controller *)

- **Jumo dTron 304** (Standard)
  2 point controller with PID action, digital display of rated/actual temperature values

- **Jumo Dicon 501**
  2 point controller with PID action, digital display of rated/actual temperature values, 10 programs, clear text display

*) program controller with the VTL with additional monitoring unit for:
- Monitoring the main evaporation time, independent of the program controller.
- Automatic switching to a reduced volume of air after the main evaporation phase has been completed. Protective aim: safe operating method, even in cases of malfunctioning or erroneous programming.

Automatic switches

- **Daily program timer 24 h**
  – Switching on and off
  – Minimal switching cycle 15 min
  – 150 h memory back up

- **Weekly program timer 168 h**
  – Switching on and off
  – Minimal switching cycle 2 h
  – 150 h memory back up

- **Digital weekly program timer 168 h** (only with VTU)
  – Switching on and off
  – 5 years by lithium battery memory back up
  – Digital display

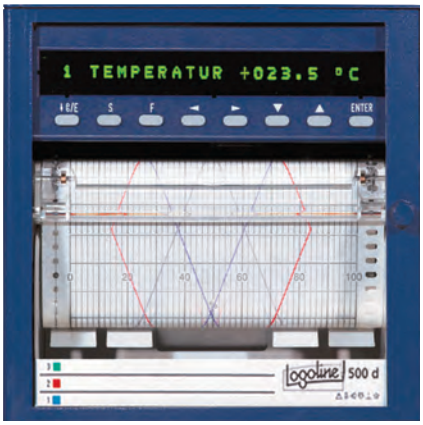
Upper temperature limit protection

- **Safety temperature limiter STB**
  Switches heating off permanently if the nominal temperature is exceeded.
  Protective aim:
  Operating personnel, surroundings and dryer

- **Temperature limit cut-out TWB** (standard with VTL)
  Totally independent of the temperature control equipment. The limit temperature is adjustable. The heating is switched off permanently when the set temperature is reached.
  Protective aim:
  Operating personnel, surroundings, dryer and charging specimen

Temperature registration

- **Single channel line recorder**



Type Jumo Logoline 500d
– Measuring range can be freely configured
– Paper scroll, 100 mm recording width
– A fixed resistance thermometer (Pt100) for recording the working chamber temperature

- **6 channel dot matrix printer**
  Type Jumo Logoprint 500
  – Measuring range can be freely configured
  – Paper scroll, 100 mm recording width
  – 6 flexible sensors (NiCr-Ni) for recording the goods temperature

- **Single connection for external temperature recording**
  A fixed resistance thermometer (Pt100) for recording the working chamber temperature, installed in the switching cabinet on connection terminals

- **6 connections for external temperature recording**
  6 flexible sensors (NiCr-Ni) for recording the goods temperature, connection box at rear in switching cabinet (incl. mating connector)

Additional equipment . . .

Pushthrough design
(from model size 75/100 on)

The unit is fitted with doors at the front and rear. The dryer can thus be built into a wall or integrated into an assembly line.

Vertical air flow

The dryer can also be delivered with vertical circulating air flow from below to above in the working chamber instead of the standard horizontal air flow, thus enabling the air flow inside the dryer to be adapted to suit the product requirements (with this design the working chamber height reduces about 100 mm).

Shutter wall
(from model size 75/100 on)

This enables the air flow conditions to be adapted to the individual types of load (e.g. in the case of an uneven load).

Fresh air filter

Different filter systems are available for processes with an increased cleanlines requirements:
– Filter category F5, with 95 % filtration efficiency
– Filter category H13 (HEPA), with 99.95 % filtration efficiency in the case of a reference particle size of 0.5 µm

Exhaust air fan and fresh air fan (F5)

Circulating air filter

Filter category G4, in the diameter of the air inlet in the working chamber, 93 % filtration efficiency.

Exhaust air fan
(standard with VTL)

Advantages of exhaust air ventilator:
Accelerates drying process, thanks to an increased air exchange rate and quicker cooling.
A slight vacuum is created in the working chamber.
This prevents vapour from escaping (e.g. during tempering).

Door window

Safety glass door window.
An additional door acts as protection against contact.

Electrical door lock
(only with VTU)

For greater quality and safety.
Prevents interruption of heat treatment caused by unauthorised or unintentional opening of door.

Caulk-welded inner casing
(standard with VTL)

Prevents the ingress of vapour or moisture into the thermal insulation layer.

Tubular leadthroughs

Sealable, with diameters of 24 and 40 mm for inserting measuring lines.

Flashing alarm light

Flashing lamp, signalling unit malfunction (red) or the end of a process (yellow) in connection with a program controller.

Recessed floor rails

Facilitates the ground level insertion of a charging trolley into the working chamber (available from model size 75/100 on).

Folding ramp
(from model size 75/100 on)

For inserting a charging trolley (e.g. for processes involving an inert gas atmosphere).

. . . and technical data

Model size		VTU I VTL 60/60	VTU I VTL 60/90	VTU I VTL 75/100	VTU I VTL 100/150	VTU I VTL 125/200	VTU I VTL 150/200	VTU I VTL 200/200
Working chamber dimensions								
Width	mm	600	600	750	1000	1250	1500	2000
Height	mm	600	900	1000	1500	2000	2000	2000
Depth	mm	600	600	750	1000	1250	1500	2000
Max. external dimensions								
Width	mm	1000	1000	1470	1840	2090	2340	2900
Height	mm	1673	1973	1842 I 1900	2389 I 2443	2889 I 3029	2889 I 3029	2889 I 3029
Depth	mm	1030 I 1250	1030 I 1250	1210	1450	1700	1950	2450
Volume								
Working chamber volume	m^3	0.216	0.324	0.562	1.5	3.125	4.500	8.000
Vapour chamber volume	m^3	0.369	0.502	0.998	2.447	4.615	6.431	10.957
Shelves (max. no.)		8	10	12	15	20	--	--
Weights								
Weight of empty oven	kg	275 I 295	305 I 330	460 I 475	780 I 800	1100 I 1130	1350 I 1380	1720 I 1750
Load capacity	kg	150	150	400	400	400	on request	on request
Load (reinforced inner casing)	kg	300	300	1000	1000	1000	on request	on request
Floor load	kg	--	--	200	200	200	1000	1000
Reinforced floor load	kg	--	--	1000	1000	1000	2000	2000
Charging trolley (max.)	kg	--	--	300	300	300	on request	on request
Shelves, concentrated load	kg	10	10	10	10	10	--	--
Shelves, area load	kg	20	20	20	20	20	--	--
Grate, concentrated load	kg	50	50	50	50	50	--	--
Grate, area load	kg	200	200	200	200	200	--	--
Electrical power								
Heat output, standard	kW	7.2	7.2 I 14.4	18.0	27.0	36.0	48.0	54.0
Connected load, standard	kW	8.5	8.5 I 15.5	20.0	29.0	39.0	52.0	58.0
Heat output, reduced	kW	--	--	9.0	18.0	27.0	on request	on request
Heat output, increased	kW	14.4	14.4	--	36.0	45.0	on request	on request
Rated voltage	V	400	400	400	400	400	400	400
Power consumption air circulation[1] 250 °C	kWh/h	2.0	2.5	4.5	8.7	9.0	10.0	13.0
Power consumption exhaust air[2] at 250 °C	kWh/h	3.8	4.0	11.2	18.0	20.0	22.3	24.2
Degree of protection		IP 54	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54
Temperature								
Nominal temperature 250 °C		● I ●	● I ●	● I ●	● I ●	● I ●	● I ●	● I ●
Nominal temperature 300 °C		○ I ○	○ I ○	○ I ○	○ I ○	○ I ○	○ I ○	○ I ○
Nominal temperature 350 °C		○ I ○	○ I ○	○ I ○	○ I ○	○ I ○	○ I ○	○ I ○
Nominal temperature 400 °C		-- I --	-- I --	○ I --	○ I --	○ I --	○ I --	○ I --
Temperature distribution, spatial								
at 250 °C (circulating air)	K	±2.0	±2.0	±2.0	±2.0	±2.0	±4.0	±6.0
at 300 °C (circulating air)	K	±2.5	±2.5	±3.5	±2.5	±2.0	±5.0	±7.0
at 350 °C (circulating air)	K	±3.0	±3.0	±4.0	±3.0	±3.0	±6.0	±8.0
at 250 °C (fresh air)[2]	K	±3.5	±4.0	±2.0	±2.0	±2.0	±5.5	±7.0
at 300 °C (fresh air)[2]	K	±4.5	±4.5	±3.0	±2.5	±2.5	±6.5	±8.0
Time								
Rise time, circulating air to 250 °C	min.	20 I 30	24 I 20	20	20	25	35	35
to 300 °C	min.	30 I 40	30 I 22	30	30	35	45	45
Cooling rate to 60 °C[2] from 250 °C	min.	65	60	40	50	60	80	95
from 300 °C	min.	85	75	55	60	70	95	115
Recovery time to 250 °C after 30 sec.	min.	2.5/3.0	2.0/2.5	2.0/3.0	2.5/4.0	3.0/4.0	3.5/4.0	3.5/4.0
after 60 sec.	min.	3.0/4.0	2.0/3.0	2.5/4.5	3.0/6.0	3.5/5.0	4.0/5.0	4.0/5.5
Quantity of solvent max.								
at 200 °C	g	13.7	18.6	33.7	60.1	92.8	108.8	145.9
at 250 °C	g	8.9	12.2	22.1	40.3	62.9	74.7	102.1
at 300 °C	g	5.9	8.0	14.7	27.0	42.8	51.2	71.2
Air flow (horizontal)								
Air velocity	m/s	0.9	0.6	0.9	0.6	0.6	0.55	0.6
Circulating air (fan output)	m^3/h	1200	1200	2400	3400	5400	6000	9000
Exhaust air for VTU[1] I VTL[2]	m^3/h	30 I 102	30 I 138	60 I 240	60 I 360	60 I 480	60 I 480	60 I 480
Air changes for VTU[1] I VTL[2]	$min.^{-1}$	0.8 I 4.6	0.6 I 3.4	1 I 4	0.4 I 2.5	0.2 I 1.7	0.16 I 1.25	0.13 I 1.0
Noise level[3]	dB (A)	< 70	< 70	< 70	< 70	< 70	< 70	< 70

[1] With open air intakes (only closed with VTU) [2] With air outlet blower (only with VTL) [3] Measured in free field 1 m in front of the chamber ○ Optional ● Basic equipment

Basic design, additional equipment . . .

Charging trolley/ Platform trolley

For the preparation and insertion of complete charges in the working chamber and for transportation within the company.

Charging trolley with shelves

Shelves, grates, charging trays

For locating different workpieces.
The choice depends on the dimensions and weight of the piece involved.

Rotating drum trolley

Heat and drying ovens with rotating drum trolley for tempering of small parts/bulk goods

Unit series (model size)	60/ 60	60/ 90	75/ 100	100/ 150	125/ 200	150/ 200	200/ 200
Basic design							
Nominal temperature 250 °C	●	●	●	●	●	●	●
Nominal temperature 300 °C	○	○	○	○	○	○	○
Nominal temperature 350 °C	○	○	○	○	○	○	○
Nominal temperature 450 °C (only with VTU)	--	--	○	○	○	○	○
Pushthrough design[1]	--	--	○	○	○	○	○
Rotating drum design[1]	--	--	○	○	○	--	--
Outer casing							
Lacquered according to RAL 9002	●	●	●	●	●	●	●
Special lacquer (specify when placing order)	○	○	○	○	○	○	○
Inner casing							
Aluminised sheet steel	●	●	●	●	●	●	●
Stainless steel 1.4301	○	○	○	○	○	○	○
Reinforced	○	○	○	○	○	○	○
Caulk-welded (standard with VTL)	○	○	○	○	○	○	○
Electrical design							
400 V 3Ph, PE AC, 50/60 Hz	●	●	●	●	●	●	●
230 V 3Ph, PE AC, 50/60 Hz	○	○	○	○	○	--	--
Additional equipment							
Electrical design							
Reduced heating output	--	--	○	○	○	○	○
Increased heating output	--	--	--	○	○	○	○
Switchbox mounted on left	--	--	○	○	○	○	○
Switchbox cabinet mounted on wall	○	○	○	○	○	○	○
Temperature controller							
Jumo dTron 304	●	●	●	●	●	●	●
Jumo dTron 304 preliminary contact & time lag relay	○	○	○	○	○	○	○
Jumo Dicon 501	○	○	○	○	○	○	○
SIMPAC*	○	○	○	○	○	○	○
SIMPATI*	○	○	○	○	○	○	○
Further temperatur sensors on request	○	○	○	○	○	○	○
Temperature safeguard							
Temperature limiter (TB)	●	●	●	●	●	●	●
Temperature limit cut-out (TWB)	○	○	○	○	○	○	○
TWB with alarm signal (standard with VTL)[1]	○	○	○	○	○	○	○
TWB with connection to central malfunction alarm[1]	○	○	○	○	○	○	○
Timers							
24 h daily program timer	○	○	○	○	○	○	○
168 h weekly program timer	○	○	○	○	○	○	○
168 h digital weekly program timer (only VTU)	○	○	○	○	○	○	○
Temperature recording							
NiCr-Ni connection (1x) for external recorder	○	○	○	○	○	○	○
NiCr-Ni connection (6x) for external recorder	○	○	○	○	○	○	○
1 channel recorder (144 x 144 lines)	○	○	○	○	○	○	○
6 channel dot matrix printer (144 x 144)	○	○	○	○	○	○	○
Preparation for recorder (144 x 144)	○	○	○	○	○	○	○
Door design							
1 door window each leaf	○	○	○	○	○	○	○
Electrical lock (only VTU)	○	○	○	○	○	○	○
Working chamber floor							
Working chamber floor with recessed rails[1]	--	--	○	○	○	●	●
Working chamber floor reinforced	--	--	○	○	○	○	○
Working chamber floor with folding ramp[1]	--	--	○	○	○	○	○
Air supply/Exhaust air							
Fresh air filter category F5 attached	○	○	○	○	○	○	○
HEPA fresh air filter category H13	○	○	○	○	○	○	○
Circulating air filter category G4	--	--	○	○	○	○	○
Exhaust air blower (standard with VTL)	○	○	○	○	○	○	○
Exhaust air blower with electrically adjustable regulating flap (only VTU)	○	○	○	○	○	○	○

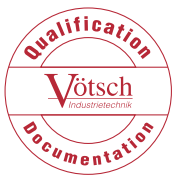
[1] Only one choice available ○ Optional ● Basic equipment

. . . and accessories for VTU and VTL

Accessories	60/ 60	60/ 90	75/ 100	100/ 150	125/ 200	150/ 200	200/ 200
Miscellaneous modules							
Elapsed-time meter	○	○	○	○	○	○	○
Signal for malfunction alarm	○	○	○	○	○	○	○
Signal for end of process	○	○	○	○	○	○	○
3-colour light column	○	○	○	○	○	○	○
Shutter wall, adjustable, aluminised sheet steel[1]	--	--	○	○	○	○	○
Shutter wall, adjustable, stainless steel 1.4301[1]	--	--	○	○	○	○	○
Inserts							
Wire-mesh shelf	○	○	○	○	○	--	--
Grate, steel	○	○	○	○	○	--	--
Support bracket, stainless steel	○	○	○	○	○	--	--
Charging tray, 25 mm rim height, 1/1 size or 1/2 size	○	○	○	○	○	--	--
Charging trolley							
Aluminised sheet steel or stainless steel	--	--	○	○	○	○	○
Accessories for charging trolley, coated sheet steel or stainless steel							
Wire-mesh shelves	--	--	○	○	○	○	○
Grate, steel	--	--	○	○	○	○	○
Support bracket, stainless steel	--	--	○	○	○	○	○
Charging tray, 25 mm rim height, 1/1 size or 1/2 size	--	--	○	○	○	○	○
Platform trolley	--	--	○	○	○	○	○
Rotating drum charging trolley	--	--	○	○	○	--	--
Leadthrough							
Tubular leadthrough 24 mm or 40 mm	○	○	○	○	○	○	○
Door lock	○	○	○	○	○	○	○
Fixing mechanism for anchoring in floor	○	○	○	○	○	○	○

[1] Only one choice available ○ Optional ● Basic equipment

CE



It's your choice . . .

Owing to their modular construction, these series of drying ovens offer a great variety of accessories to choose from. You can put together your oven suit your applications.

Have you thought of everything?

- For what application is the drying oven required?
- Is combustible solvent vapour released during the heating/drying process? In what quantities? (unit selection: VTL)
- Which model size is required? (working chamber size W x H x D)
- Type of coating?
- How many shelves, grates, trays are required?
- Should a temperature/time program be run?
- How many programs are to be saved?
- Should temperatures be registered/documented?
- Are several units to be networked with a PC?
- Is complete traceability required for production processes?
- Is recording of data (product, operator, system) via BarCode required?
- Are tubular leadthroughs required for other measuring purposes?
- Should the process in the working chamber be visible?
- Should unauthorised opening of the door during the process be prevented?
- Is the standard fresh air/exhaust air volume sufficient?
- Should the fresh air be filtered?
- Is aggressive vapour released during the process?
- Should the unit have reached operating temperature at the start of the shift?

Heating technology for each application . . .

Standard and customised solutions

- Heating and drying ovens
- Clean air, heating and drying ovens
- Explosion-proof ovens
- Heating and tempering ovens up to 750 °C
- Chest ovens for easy top loading
- Drawer-type ovens
- Walk-in ovens and systems for continous heating processes
- Hot air sterilisers (for normal and clean air conditions)
- Vacuum, heating and drying ovens
- Charging systems, i.e. charging trolleys, transport trolleys and wire-mesh grates
- Heating options, such as electric heating, gas, infra red, microwave, warm water, steam, thermal oil
- Accessories and software for process documentation as stipulated in EN ISO 9001 in order to ensure controlling, monitoring and documenting as well as networking of up to 99 units.

Competence and dedication to the customer's needs . . .

- Individual consultation
- Design and development
- Production and assembly
- Commissioning and briefing
- Calibration in own laboratory
- Maintenance, spare parts service, repair
- Recycling of redundant units
- Training and workshops

Vötsch Industrietechnik

Product Range Heat Technology

Greizer Strasse 41 – 49
35447 Reiskirchen-Lindenstruth
Germany

Phone: +49 64 08 84-73
Fax: +49 64 08 84-8747
info-wt@v-it.com · www.voetsch.info