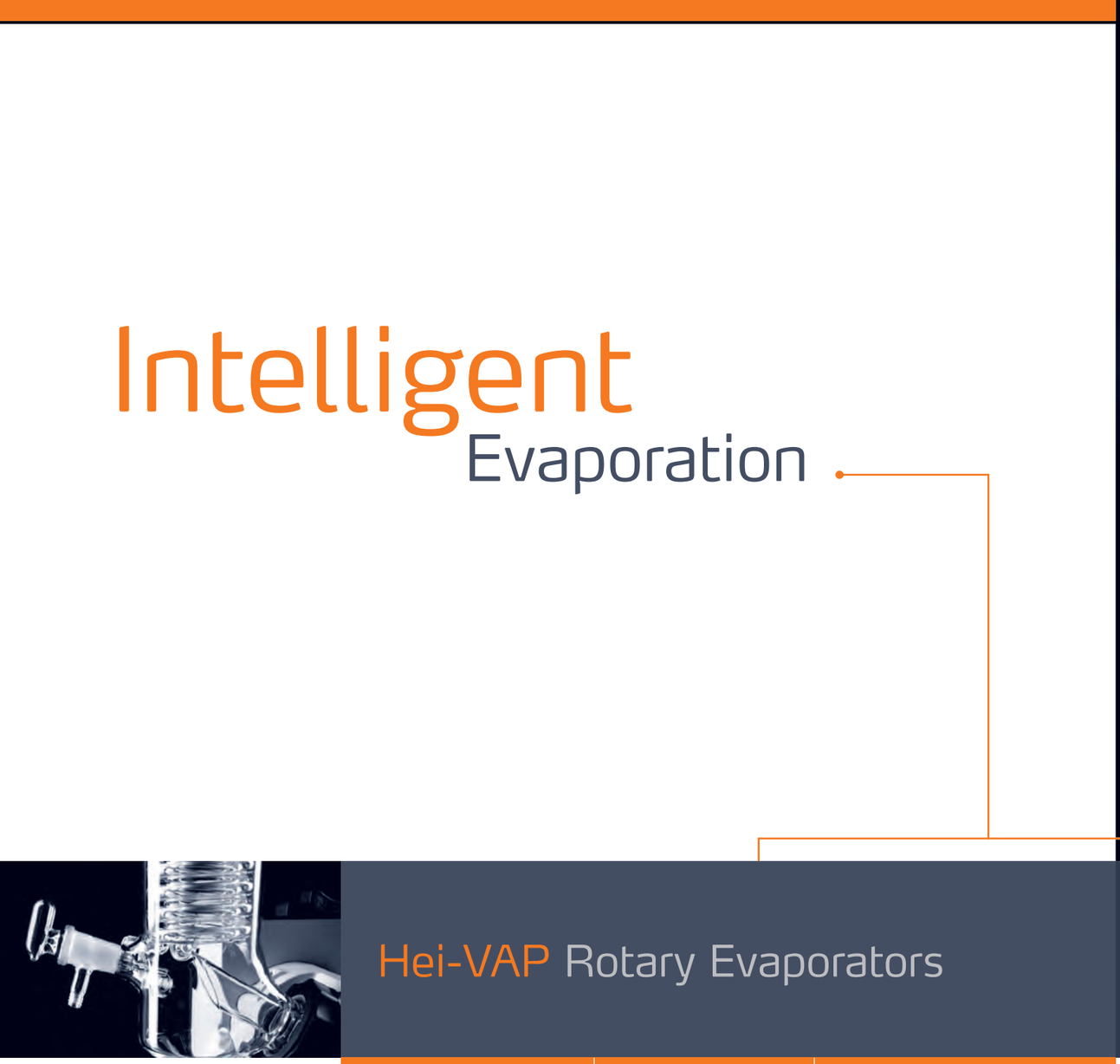
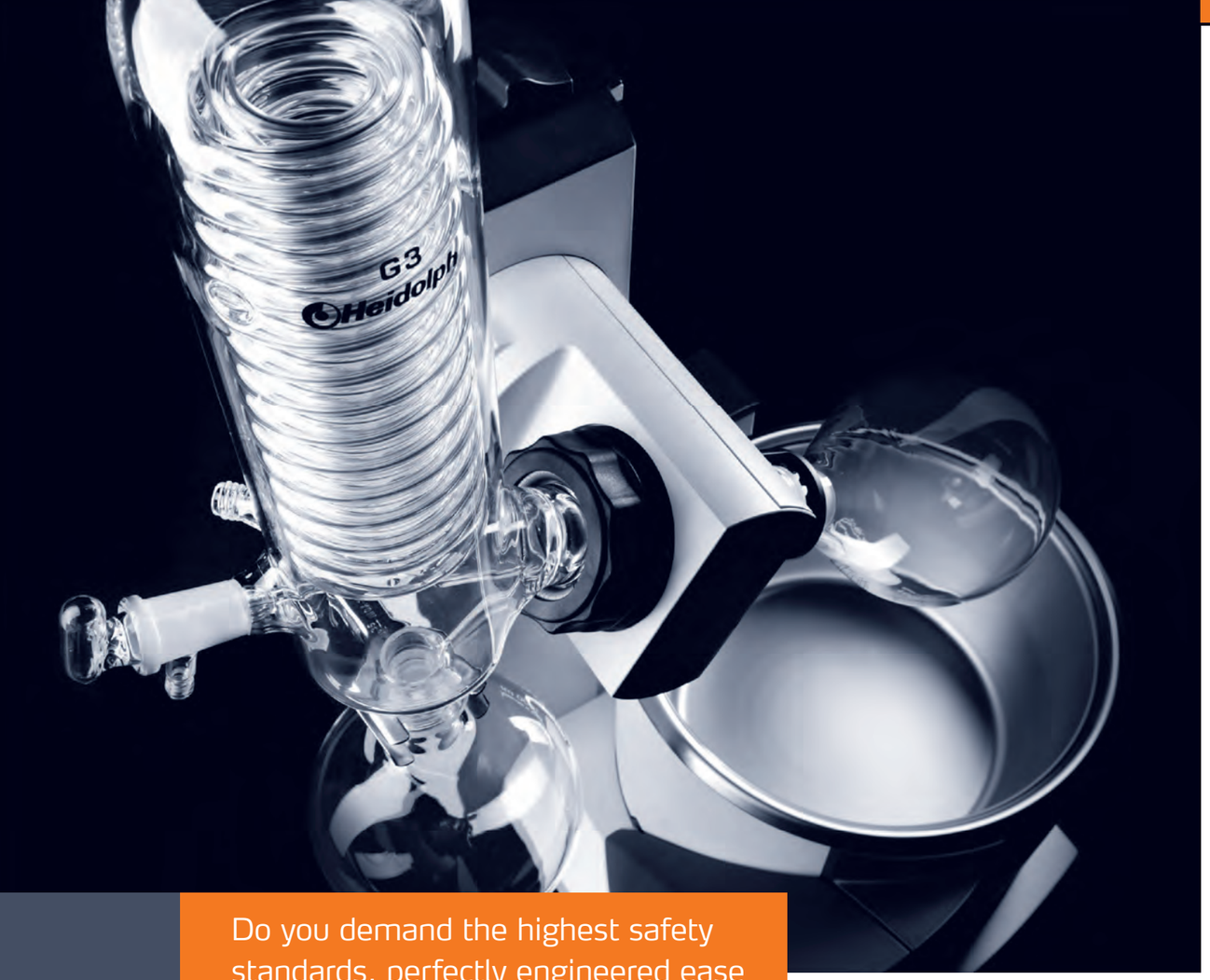
Intelligent
Evaporation



Hei-VAP Rotary Evaporators

Leading Safety Standards | Superior Ease of Use | Reduced Cost of Ownership

Heidolph
Research made easy



Do you demand the highest safety standards, perfectly engineered ease of use and reduced cost of ownership?

Intelligent Evaporation...

... stands for an overheat protection design that prevents water baths running dry, provides a detachable panel for superior ease of use from outside closed fume hoods and offers a proven vacuum seal and vapor tube system guaranteed for years of operation!

Leading **Safety Standards**

- Two independent safety circuits **avoid an overheat situation** of your heating bath: If bath temperature overshoots by 5 °C and if your water bath runs dry, heating will be switched off automatically
- **To avoid** an overtemperature situation and potential **thermal damage** to your sample, you can individually pre-program a maximum temperature on the Hei-VAP Precision, at which the bath powers off
- In case of a power cut, all motor lift models will remove the flask from the heating bath **preventing safety hazards** and potential thermal damage to your sample
- **To protect you from splashes and scalding**, the Hei-VAP heating bath features an integrated pour spout to remove bath fluid safely
- Heating bath is constructed with a **double wall** for your protection against burns and scalding
- The guard hood **covers the entire bath completely** even if the heating bath is adjusted horizontally to its most extreme limit
- A **metal support** between the heating bath and the base unit **prevents bath instability**
- To **protect** your heating bath **against short-circuits and systematic corrosion,** the cable coupling complies with the protection class IP 67
- For your protection, the operating panel is located near the base so as to **keep your hands out of the dangerous zone** of rotating flasks, steam and splashing bath fluids
- All heating baths feature **non-slip handles** with safety grip to protect you from scalding bath liquids and allow for easy installation/removal of the bath
- A separate on/off switch for heating **prevents unintentional heat-up.** The button is illuminated for visual control
- In case of an overshoot of any parameter setting, all models will show a **warning on the operating panel**
- Glassware assemblies are optionally available with **transparent plastic safety coating** ensuring ultimate protection while allowing visual control at all times
- **IQ-OQ documentation** is available for Hei-VAP models on request

Hei-VAP heating bath

YOUR ADVANTAGES

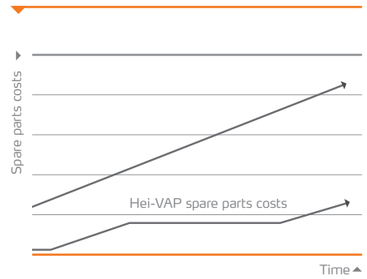
- Only the Hei-VAP heating bath reaches a temperature of 210 °C
- The universal heating bath can even accommodate 5-liter flasks
- The heating bath can be adjusted horizontally up to 200 mm
- To prevent short circuits and corrosion, the cable coupling complies with the protection class IP 67
- Non-slip handles for safe transportation eliminate the risk of scalding
- An integrated pour spout to remove bath fluid safely

Superior **Ease of Use**

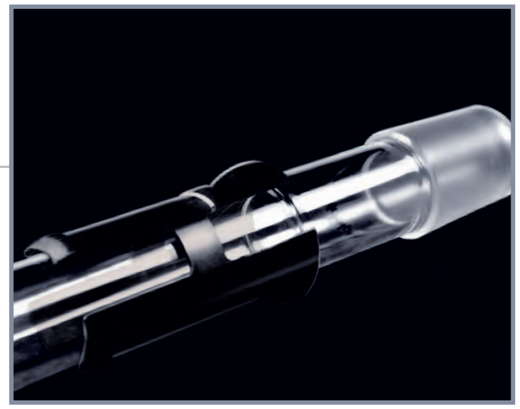
- The detachable operating panel can be attached via velcro or with a special suspension at eye level for your convenience from **outside closed fume hoods**
- The patented evaporating flask **clamp Easy-Clip cannot be lost** due to a connection to the vapor tube coupling ring
- The integrated screwed ring allows you to **remove sticking evaporating flasks** from the vapor tube **just in seconds** in a safe manner
- The universal heating bath can be adjusted horizontally up to 200 mm and offers efficient space to **accommodate even 5-liter flasks**
- For your convenience, the **height of 160 mm** and the **angle** of the evaporating flask can be **adjusted easily from 20° to 80°**
- The optional automatic module Hei-VAP Distimatic allows for **continuous and unattended automatic operations**

Reduced Cost of Ownership

- **Reduce your process times** up to 30 %
- The chemical-resistant vacuum seal **reduces your spare parts budget** up to 75 % with prolonged operational lifespan
- The patented clamping sleeve ensures a **long life performance of the vapor tube**
- Increase your range of applications by using 5-liter flasks in the universal bath at **no added costs**
- Maintenance-free and non-sparking motors **reduce repairs and down times significantly** to ensure years of continuous operation
- The flange on the condenser side of the drive is made of PPS (Polyphenylene sulfide), a robust industrial-designed resin with **superior chemical resistance** which provides more chemical resistance than stainless steel or welded aluminum. This reduces corrosion to a minimum which results in additional savings on maintenance and replacement components
- Only Hei-VAP heating baths reach a temperature of 210 °C which is 30 °C higher than other evaporators on the market and allow for a **broader range of applications** which previously could not be performed on any rotary evaporator (for example bitumen distillation). Thus, increasing the range of applications eliminates the need for investment in other equipment
- Spend your working hours more effectively on other challenges which require your attention and **evaporate large quantities continuously** with the automatic module Hei-VAP Distimatic
- Maximize your initial investment significantly: the automatic module Hei-VAP Distimatic is an **affordable and more flexible alternative** to large-scale rotary evaporators
- Reduce your maintenance costs. The sealed housing protects your rotary evaporator from aggressive fumes, liquids and vapors to prevent internal corrosion. This results in an **increased lifespan of 10 years** on average at a reduced maintenance and repair cost



Vapor tube with patented clamping sleeve



YOUR ADVANTAGES

- The patented clamping sleeve system allows to remove the vapor tube easily from the drive
- Years of performance life reduce your spare parts budget up to 75 %
- The Hei-VAP vapor tube does not get stuck in the drive, thus eliminating the risk of broken glass
- Immediate removal of the vapor tube from the drive facilitates your work

Patented flask clamp Easy-Clip

YOUR ADVANTAGES

- Easy-Clip can't get lost due to a direct connection to the drive
- The integrated screwing allows an easy removal of sticking flasks
- The Easy-Clip is made of highly resistant synthetic material which ensures a long life performance

Operating panel

YOUR ADVANTAGES

- Changing all parameters from outside closed fume hoods guarantees the highest safety level
- Standard for all models is a panel with 1 m cable connection. Thus data security is guaranteed at any time
- Immediate access to the panel ensures ultimate control of the process while increasing your ease of use
- A separate on/off switch for heating prevents unintentional heat-up – the button is illuminated for visual control

Intelligent Evaporation

Heidolph Research made easy

MADE IN GERMANY

Leading Safety Standards | Superior Ease of Use | Reduced Cost of Ownership

The average operational lifespan of 10 years is backed by a 3 year warranty and makes your purchase a worthwhile investment.

Chemical-resistant **vacuum seal** allows **for years of operation** and reduces spare parts budget up to 75 %

The flange made of **chemical-resistant** PPS reduces corrosion, maintenance and spare parts cost to a minimum

Non-sticking vapor tube with patented clamping sleeve eliminates broken glass and reduces spare parts cost significantly

The **patented Easy-Clip provides an easy removal** of sticking flasks and **can´t get lost** due to the direct connection to the drive

Bath power cable coupling complies with protection class IP 67 to **prevent corrosion and short circuits**

Safety bath will power off if temperature overshoots by 5 °C or runs dry

210 °C heating bath with safety handles and pour spout accommodates **5-liter flasks**

Detachable panel allows for the **highest operational safety** from outside closed fume hoods

Continuous unattended evaporation without limits: the automatic module Hei-VAP Distimatic with automatic release of condensate is an affordable and more flexible alternative to large-scale rotary evaporators

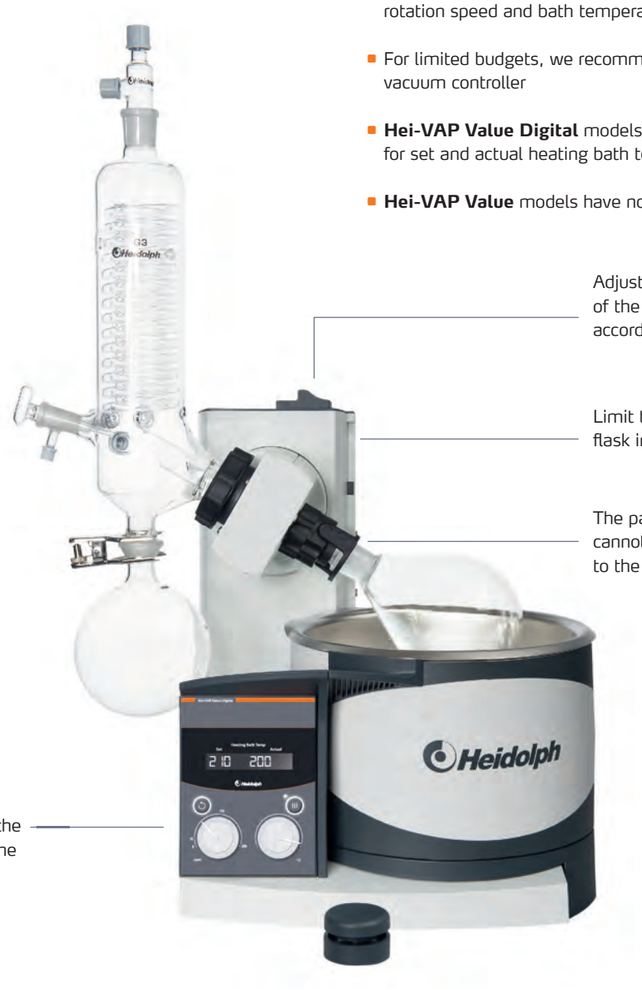
A separate on/off switch for heating **prevents unintentional heat-up** – the button is illuminated for visual control

A metal support between the heating bath and the base unit **prevents bath instability**

Hei-VAP Value / Hei-VAP Value Digital

Affordable model with hand lift for all standard applications
Includes leading safety standards and features for superior ease of use and reduced cost of ownership, plus:

- The convenience of large dial controls for adjustment of rotation speed and bath temperature
- For limited budgets, we recommend the optional Manual vacuum controller
- **Hei-VAP Value Digital** models come with a digital display for set and actual heating bath temperature
- **Hei-VAP Value** models have no digital display



Hei-VAP Value Digital HL/G3
P/N 560-01302-00

Model	Hei-VAP Value hand lift (HL)		Hei-VAP Value Digital hand lift (HL)	
Glassware	**standard**	**coated**	**standard**	**coated**
G1 Diagonal	560-01100-00	560-01110-00	560-01102-00	560-01112-00
G3 Vertical	560-01300-00	560-01310-00	560-01302-00	560-01312-00
G5 Dry Ice Condenser	560-01500-00	560-01510-00	560-01502-00	560-01512-00
G6 Vertical for Reflux	560-01600-00	560-01610-00	560-01602-00	560-01612-00

Hei-VAP Advantage

For your routine distillation applications and reproducible results
Includes leading safety standards and features for superior ease of use and reduced cost of ownership, plus:

- Available in hand lift or motor lift configurations
- Experience the advantages of our large digital 3.5" LCD display which indicates rotation speed, heating bath and vapor temperature
- We recommend the optional Manual vacuum controller
- Experience the advantages of the automatic process timer which turns off your evaporator at a pre-programmed time and removes evaporating flasks from bath on motor lift models
- Upgrade your Hei-VAP Advantage to a Hei-VAP Precision:

Upgrade-KIT Advantage Precision-HL
P/N 569-30009-00

Upgrade-KIT Advantage Precision-ML
P/N 569-40009-00

Hei-VAP Advantage ML/G3
P/N 562-01300-00

Model	Hei-VAP Advantage hand lift (HL)		Hei-VAP Advantage motor lift (ML)	
Glassware	**standard**	**coated**	**standard**	**coated**
G1 Diagonal	561-01100-00	561-01110-00	562-01100-00	562-01110-00
G3 Vertical	561-01300-00	561-01310-00	562-01300-00	562-01310-00
G5 Dry Ice Condenser	561-01500-00	561-01510-00	562-01500-00	562-01510-00
G6 Vertical for Reflux	561-01600-00	561-01610-00	562-01600-00	562-01610-00

Hei-VAP Precision

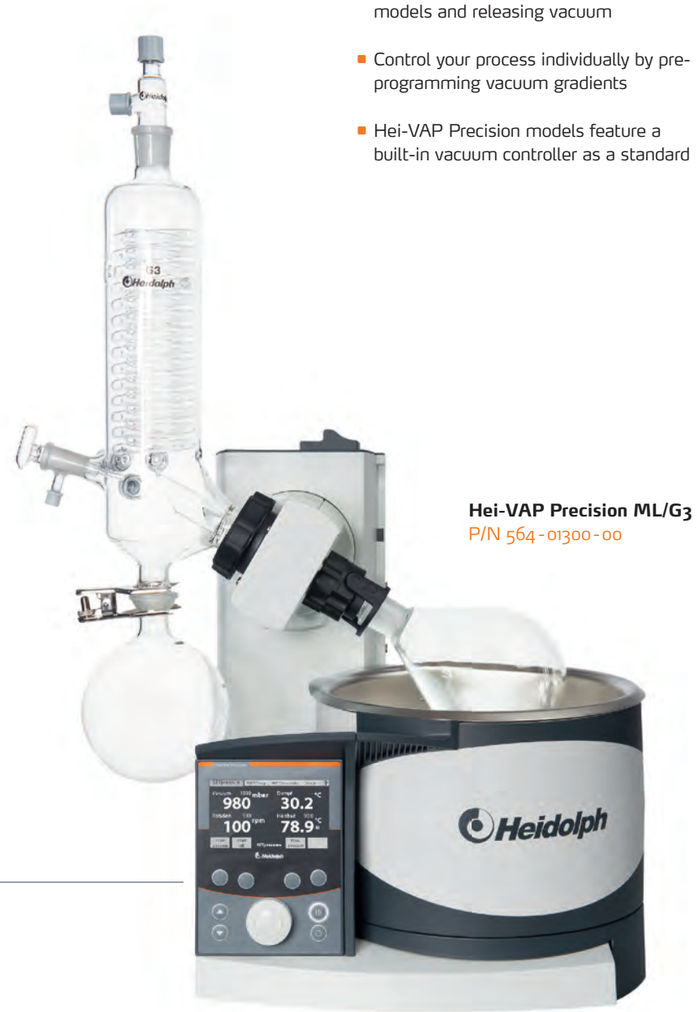
Most demanding applications and the finest integrated vacuum control capabilities
Includes leading safety standards and features for superior ease of use and reduced cost of ownership, plus:

- Available in hand lift or motor lift configurations
- Experience the advantages of our large 4.3" color graphic display which features all parameters, integrated vacuum controller and includes programs for automated distillations
- Make your life easier by utilizing the integrated software support which leads you through the capabilities of the evaporator
- For data management Hei-VAP Precision models feature a USB interface
- Save time by configuring the unit - all connected devices will be recognized by the evaporator, which eliminates the need to configure the unit manually
- Now you can manage even the most demanding applications easily and prevent foaming, excessive bubbling or bumping
- Save time with your individualized pre-programmed parameter settings for your 30 most common applications used on a daily basis by saving them in a "Favorites" section
- Each ramp offers 20 separate steps for demanding applications
- Apply an individual name to those ramps to avoid a mix-up
- Experience the advantages of the automatic process timer which turns off your evaporator at a pre-programmed time by raising the flask on motor lift models and releasing vacuum
- Control your process individually by pre-programming vacuum gradients
- Hei-VAP Precision models feature a built-in vacuum controller as a standard

For increased safety all bath temperature adjustments can be limited

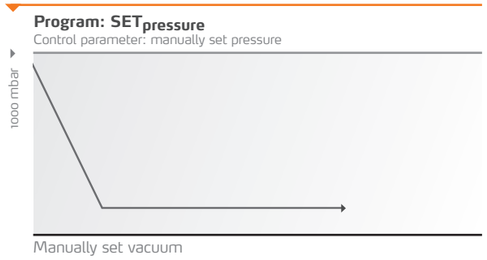
Even from a distance you will be able to monitor the numbers on the display easily

Large color graphic display for all parameters and automated programs



Hei-VAP Precision ML/G3
P/N 564-01300-00

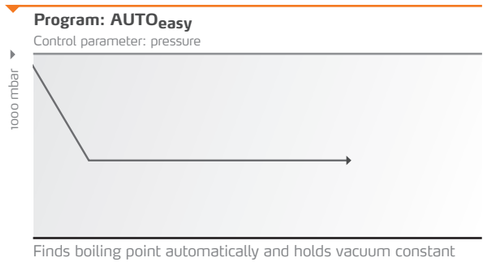
Programs facilitate process control
Reduce your process times significantly by using these three programs for automated distillation



SET$_{pressure}$

Program for solvent separations

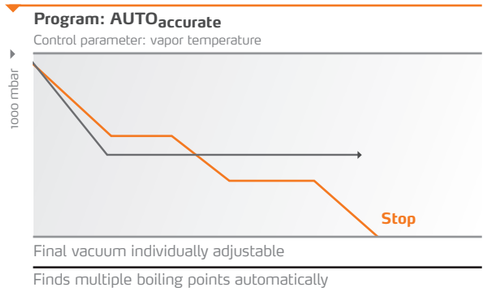
This program holds a pre-set vacuum constant. During the evacuation you have the full flexibility to choose another level of vacuum by the press of a button



AUTO$_{easy}$

Supports the automatic pressure control for solvent separations

The pressure level for the first boiling point is found automatically. This program can be used with all Heidolph glassware assemblies and does not require any accessories



AUTO$_{accurate}$

Supports very precise automatic pressure control for solvent separations

This program works similar to AUTO$_{easy}$ but in addition is able to identify multiple boiling points automatically by reducing vacuum accordingly. Also the AUTO$_{accurate}$ program delivers the finest and most precise vacuum control. To take advantage of this program, the optional AUTO$_{accurate}$-sensor is required. This program cannot be used on Heidolph G1 and G5 glassware assemblies. Leading parameter of this program is the vapor temperature

Reduce your process times via automated distillation programs

Model	Hei-VAP Precision hand lift (HL)		Hei-VAP Precision motor lift (ML)	
Glassware	**standard**	**coated**	**standard**	**coated**
G1 Diagonal	563-01100-00	563-01110-00	564-01100-00	564-01110-00
G3 Vertical	563-01300-00	563-01310-00	564-01300-00	564-01310-00
G5 Dry Ice Condenser	563-01500-00	563-01510-00	564-01500-00	564-01510-00
G6 Vertical for Reflux	563-01600-00	563-01610-00	564-01600-00	564-01610-00

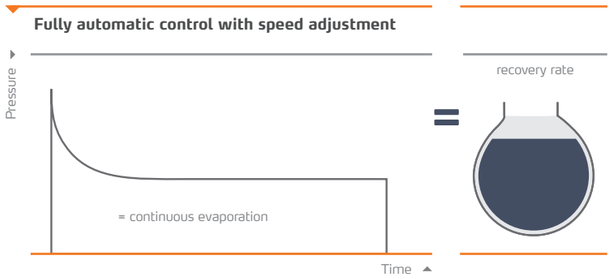
Vacuum Pumps

Advantages of all chemical-resistant diaphragm vacuum pumps

- All components which come in contact with media are built from chemically resistant fluoropolymer
- The durable PTFE design guarantees an superior diaphragm lifespan
- The head cover and clamping disc have a stable core made of metal which offers unsurpassed long-term performance of your operational parameters
- The direct pump drive (without belt) is exceptionally quiet, creates a very low vibrational environment and reduces the need of wear and tear parts to a minimum
- The gas ballast valve has been optimized to prevent media condensing in the pump

RPM Regulated Vacuum Pumps

RPM regulated pumps adjust their speed individually and come to a complete stop when the required vacuum level is reached



YOUR ADVANTAGES

- Speed adjustment stops completely if vacuum is reached and runs intermittently at very low speed to hold vacuum constant
- Increased diaphragm performance life due to periods of non-operation
- Low energy consumption due to intermittent operation
- Significant noise and vibration reduction due to periods of non-operation
- Operates without vacuum valve
- Most precise vacuum level at all times

Highest distillation rates possible and reducing process time by 30 %

Stable distillation conditions account for solvent recovery up to 100 %

RPM Regulated Vacuum Pumps

Rotavac Vario Pumping Unit

Fully controllable stand-alone pumping unit including vacuum controller. For Hei-VAP Value and Hei-VAP Advantage

Rotavac Vario Pumping Unit
P/N 591-00142-00
Condenser
P/N 591-00084-00

- Three-stage diaphragm pump is made from chemical-resistant material
- High suction capacity of 1.7 m³/h for fastest evacuation
- Achieves an ultimate vacuum of 5 mbar
- Precise vacuum control avoids bumping and eliminates foaming of your evaporation solution
- Due to automatic vacuum supply to the process parameters you have more time for important laboratory activities
- Can be combined with a condenser
- Power input: 160 W, Weight: 6.0 kg
- Dimensions (without condenser): L263 / W193 / H299 mm

Rotavac Vario Tec

For Hei-VAP Precision

Rotavac Vario Tec
P/N 591-00171-00
Condenser
P/N 591-00084-00

- Two-stage diaphragm pump is made from chemical-resistant material
- Suction capacity of 1.0 m³/h
- Achieves an ultimate vacuum of 12 mbar
- Recommended for solvents with low or medium boiling points
- Can be combined with a condenser
- Power input: 160 W, Weight: 4.3 kg
- Dimensions (without condenser): L156 / W236 / H196 mm

Rotavac Vario Control

For Hei-VAP Precision

Rotavac Vario Control
P/N 591-00141-00
Condenser
P/N 591-00084-00

- Three-stage diaphragm pump is made from chemical-resistant material
- High suction capacity of 1.7 m³/h for fastest evacuation
- Achieves an ultimate vacuum of 2 mbar
- Even if the gas ballast valve is open an excellent ultimate vacuum is reached when working with easily condensable vapors. This makes distilling high boiling point solvents such as DMF or DMSO possible at low bath temperatures
- Can be combined with a condenser
- Power input: 160 W, Weight: 5.4 kg
- Dimensions (without condenser): L167 / W236 / H196 mm

Valve-Regulated Vacuum Pumps

Standard vacuum pumps can be controlled manually or via valve operated vacuum controllers

Rotavac Valve Tec

For all Hei-VAP models

Rotavac Valve Tec P/N 591-00160-00
Condenser P/N 591-00083-00

- Two-stage diaphragm vacuum pump made of chemical-resistant material
- Suction capacity of 0.75 m^3/h
- Achieves an ultimate vacuum of 12 mbar
- Recommended for solvents with low or medium boiling points
- Vacuum can be controlled manually or via valve operated vacuum controllers
- Can be combined with a condenser
- Power input: 80 W, Weight: 6.0 kg
- Dimensions (without condenser): L145 / W315 / H169 mm

Rotavac Valve Control

For all Hei-VAP models

Rotavac Valve Control P/N 591-00130-00
Condenser P/N 591-00083-00

- Two-stage diaphragm pump made from chemical-resistant material
- High suction capacity of 2.0 m^3/h for fastest evacuation
- Achieves an ultimate vacuum of 7 mbar
- Suction capacity for up to 3 rotary evaporators at the same time
- Vacuum can be controlled manually or via valve operated vacuum controllers
- Depending on your application you can switch on and off the vacuum pump via switchbox
- Can be combined with a condenser
- Power input: 180 W, Weight: 12.8 kg
- Dimensions (without condenser): L195 / W245 / H310 mm

Chillers

RotaChill L

Highest cooling capacity at minimal bench space

RotaChill L
P/N 591-00200-00

- This chiller is designed specifically for rotary evaporators
- Minimal bench space due to unique "L-shape design"
- Provides space of 470 x 405 mm for evaporator
- Temperature range from -10 °C to +40 °C
- Temperature control accuracy of ±0.5 °C
- Display for setting temperature and reading out actual temperature
- Maximum cooling capacity of 420 W
- Footprint of chiller: L580 / W470 / H420 mm

Rotacool Mini

Ideal for standard applications

Rotacool Mini
P/N 591-00210-00

- Chiller for all standard applications
- Cooling temperature: +7 °C (not adjustable)
- Cooling capacity at +7 °C: 370 W
- Temperature control accuracy of ±1 °C
- No digital display
- Small footprint of chiller: L450 / W225 / H400 mm

RotaChill

The affordable model

RotaChill
P/N 591-00220-00

- Temperature range from 0 °C to +100 °C
- Precise temperature control accuracy of ±0.2 °C
- The RotaChill should be placed directly besides the evaporator to ensure a sufficient pump performance
- Footprint of chiller: L450 / W210 / H570 mm

		RotaChill L	Rotacool Mini	RotaChill
Temperature range	[°C]	-10 to +40	+7 constant	0 to +100
Coolant volume	[L]	2	3	6
Cooling capacity* at:+20 °C	[W]	420	-	200
+7 °C		-	370	-
0 °C		350	-	140
-10 °C		220	-	-

* at 20 °C ambient temperature

The Modular Concept

The modular concept consists of rotary evaporator, vacuum pump, controller and chiller

YOUR ADVANTAGES

- All components are technically designed to function perfectly together
- Self-contained system eliminates the need for water, dry ice and vacuum source
- Heidolph offers you a complete system available from one manufacturer
- Use your lab space efficiently: The modular concept has a footprint of 470 x 580 mm only

Accessories

Guard hood

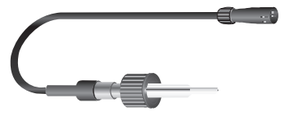
- Strong and transparent guard hood to protect you from implosions
- Provides easy and immediate access to flask and bath

P/N 569-00010-00

Guard shield

- Strong and transparent guard shield for your protection while changing flasks
- Attached at the edge of the bath

P/N 569-00020-00



Vapor temperature sensor

- For Hei-VAP Advantage and Hei-VAP Precision

P/N 569-00030-00

AUTO$_{accurate}$-sensor

- For Hei-VAP Precision
- Only in combination with glassware set G3 and G6

P/N 569-00040-00

Tube set

- Includes 6.25 meter vacuum tubing and 6.25 meter water tubing

P/N 591-35000-00

Spare PTFE vacuum seal

P/N 23-30-01-01-30

Aqua-Stop

The integrated valve closes automatically by turning off the evaporator. The system saves money by reducing your consumption of cooling tap water. Moreover the safety mechanism avoids flouding in your laboratory. (Only for Hei-VAP Advantage and Hei-VAP Precision)

P/N 569-00500-00

Spare clamping sleeve

P/N 23-30-01-05-31

Spare vapor tube NS 29/32

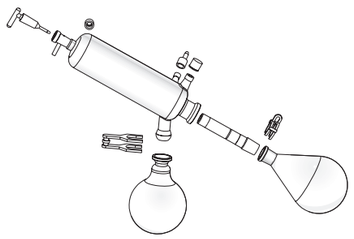
P/N 514-00000-01

Glassware

- Glassware set includes one 1,000-ml evaporating flask and one 1,000-ml receiving flask
- All glassware sets are also available with transparent plastic coating (Surlyn®-coated) for added safety, except for glassware set G5 which is Halar-coated
- Evaporating flasks and vapor tubes which come with a standard NS 29/32 joint size are also available with NS 24/29 ground joints
- Also available upon request: glassware sets for Soxhlet extraction and descending condenser system
- All glassware sets feature GL 10 thread; the inlet tube can be connected with a threaded fitting
- Glassware sets G3 and G6 allow for the automated distillation program $AUTO_{accurate}$ on Hei-VAP Precision models

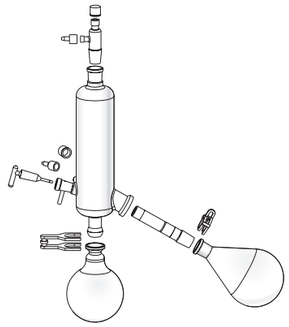
Glassware set G1

- Diagonal condenser for all standard distillations; the option with the **most affordable price**



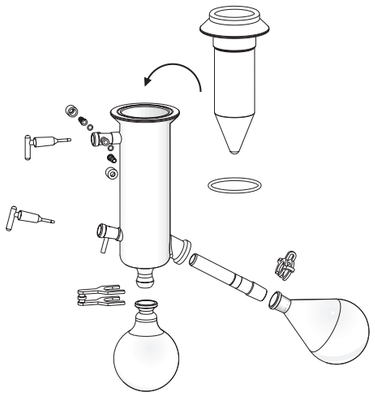
Glassware set G3

- Vertical condenser for all standard distillations; the option with the **smallest space requirement**



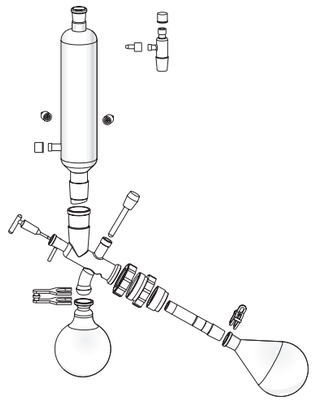
Glassware set G5

- **Dry Ice** condenser for low-boiling solvents



Glassware set G6

- Vertical condenser; centerpiece with valve **for reflux distillation**



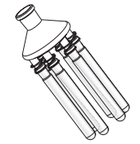
Accessories

Evaporating flasks	NS 29/32	NS 24/29
Evaporating flask* 50 ml	514-70000-00	514-70000-01
Evaporating flask 100 ml	514-71000-00	514-71000-01
Evaporating flask 250 ml	514-72000-00	514-72000-01
Evaporating flask 500 ml	514-73000-00	514-73000-01
Evaporating flask 1,000 ml	514-74000-00	514-74000-01
Evaporating flask 2,000 ml	514-75000-00	514-75000-01
Evaporating flask 3,000 ml	514-76300-00	514-76300-01
Evaporating flask 5,000 ml	514-78000-00	514-78000-03

* Evaporating flask NS 14.5 incl. adaptor (NS 29 or NS 24)

Receiving flasks	standard	coated
Receiving flask - NS 35/20 100 ml	514-81000-00	514-81000-02
Receiving flask - NS 35/20 250 ml	514-82000-00	514-82000-02
Receiving flask - NS 35/20 500 ml	514-83000-00	514-83000-02
Receiving flask - NS 35/20 1,000 ml	514-84000-00	514-84000-02
Receiving flask - NS 35/20 2,000 ml	514-85000-00	514-85000-02
Receiving flask - NS 35/20 3,000 ml	514-87000-00	514-87000-02

Powder flasks	NS 29/32	NS 24/29
Powder flask 500 ml	514-73200-00	514-73200-01
Powder flask 1,000 ml	514-74200-00	514-74200-01
Powder flask 2,000 ml	514-75300-00	514-75300-01



Spider	NS 29/32	NS 24/29
Spider with 6 distillation sleeves NS 14,5 20 ml	15-300-005-09	15-300-005-12
Spider with 12 distillation sleeves NS 14,5 20 ml	15-300-005-10	15-300-005-13
Spider with 20 distillation sleeves NS 14,5 20 ml	15-300-005-11	15-300-005-06

Spider	NS 29/32	NS 24/29
Spider with 5 flasks NS 24 50 ml	15-300-005-04	15-300-005-08
Spider with 5 flasks NS 24 100 ml	15-300-005-07	15-300-005-05

Evaporating cylinder	NS 29/32	NS 24/29
Evaporating cylinder 500 ml	514-00070-00	514-00070-01
Evaporating cylinder 1,500 ml	514-00071-00	514-00071-01

Foam brake	NS 29/32	NS 24/29
Foam brake with flask clamp	514-00004-00	514-00005-00

Vial-Adaptor	NS 29/32
Vial-Adaptor GL 18	15-300-002-81-0
Vial-Adaptor GL 25	15-300-002-82-0

Vacuum Accessories

Switchbox

Connect up to 3 rotary evaporators to one vacuum pump

Switchbox
P/N 569-00400-00

- Connect up to 3 rotary evaporators to one pump and control vacuum individually
- Pump switches off automatically at required vacuum
- Reduces energy consumption of pump
- Increases performance life of the pump due to a complete switch-off if vacuum is reached
- Vacuum valve and non-return valve are required for every evaporator if you work with different pressures at the same time
- Delivery includes 3 non-return valves
- Designed for Hei-VAP Precision
- Weight: 0.6 kg
- Dimensions: L80 x W160 x H45 mm

Manual vacuum controller

For Hei-VAP Value and Hei-VAP Advantage

Manual vacuum controller
P/N 591-26000-00

- Control your house vacuum or any other vacuum source
- Pressure range from 0 to 1,020 mbar
- Scaling on display in steps of 50 mbar
- Connection for tubes with 8 mm inner diameter
- Support rod included
- A vacuum valve is not required
- Dimensions: L80 x W80 x H150 mm

Vacuum valve

Required to control vacuum for Hei-VAP Precision models with valve-regulated pumps

Vacuum valve
P/N 569 - 00060 - 00

- External attachment design for easy cleaning
- Can be combined with the Woulff Bottle to one unit
- Not required if you utilize a Manual vacuum controller

Woulff bottle

P/N 569-00070-00

- Additional recovery of solvent to protect vacuum valve and vacuum pump
- Compatible with all Hei-VAP configurations
- Direct connection to the vacuum valve is possible
- Features connection to vacuum controller
- Volume of 250 ml

Equipment Combinations

Rotary Evaporator	Vacuum source		Accessories
Hei-VAP Value / Hei-VAP Value Digital			
	Rotavac Vario Pumping Unit	*included*	Vacuum controller
		not required	Vacuum valve
	Rotavac Valve Control Rotavac Valve Tec House vacuum	*optional*	Manual vacuum controller
Hei-VAP Advantage			
	Rotavac Vario Pumping Unit	*included* *optional* *not required*	Vacuum controller Vapor temperature sensor (all glassware sets) Vacuum valve
	Rotavac Valve Control Rotavac Valve Tec House vacuum	*optional*	Manual vacuum controller Vapor temperature sensor (all glassware sets)
Hei-VAP Precision			
	Rotavac Valve Control Rotavac Valve Tec House vacuum	*included* *required* *optional*	Vacuum controller Vacuum valve Auto$_{accurate}$-sensor (glassware G3/G6 only) Vapor temperature sensor (all glassware sets)
	Rotavac Vario Control Rotavac Vario Tec	*included* *not required* *optional*	Vacuum controller Vacuum valve Auto$_{accurate}$-sensor (glassware G3/G6 only) Vapor temperature sensor (all glassware sets)


Rotavac Valve Control with condenser


Rotavac Valve Tec with condenser


Rotavac Vario Control with condenser


Rotavac Vario Tec with condenser


Rotavac Vario Pumping Unit with condenser


Manual vacuum controller


Vacuum valve with Woulff bottle


AUTO$_{accurate}$-sensor


Vapor temperature sensor

Hei-VAP Plug & Play Packages

Hei-VAP Plug & Play Value Cool
P/N 560-91309-00

Hei-VAP Plug & Play Value

Standard equipment for your lab

Hei-VAP Plug & Play Value 1
- Hei-VAP Value with hand lift and vertical glassware set G3
- Vacuum pump Rotavac Valve Tec
- Manual vacuum controller
- Tube set

P/N 560-91300-00

Hei-VAP Plug & Play Value 2
- Hei-VAP Value with hand lift and coated vertical glassware set G3B
- Vacuum pump Rotavac Valve Control
- Manual vacuum controller
- Tube set

P/N 560-81310-00

Hei-VAP Plug & Play Value Cool
- Hei-VAP Value with hand lift and vertical glassware set G3
- Vacuum pump Rotavac Valve Tec
- Manual vacuum controller
- Chiller RotaChill
- Tube set

P/N 560-91309-00

Hei-VAP Plug & Play Advantage Cool
P/N 562-91307-00

Hei-VAP Plug & Play Advantage

For standard distillations with vacuum control

Hei-VAP Plug & Play Advantage 1
- Hei-VAP Advantage with hand lift and vertical glassware set G3
- Vapor temperature sensor
- Vacuum pump Rotavac Valve Tec
- Manual vacuum controller
- Tube set

P/N 561-41300-00

Hei-VAP Plug & Play Advantage 2
- Hei-VAP Advantage with motor lift and coated vertical glassware set G3B
- Vapor temperature sensor
- Vacuum pump Rotavac Vario Pumping Unit
- Tube set

P/N 562-11310-00

Hei-VAP Plug & Play Advantage Cool
- Hei-VAP Advantage with motor lift and vertical glassware set G3
- Vacuum pump Rotavac Valve Tec
- Manual vacuum controller
- Chiller Rotacool Mini
- Tube set

P/N 562-91307-00

Hei-VAP Plug & Play Precision 2
P/N 563-51310-00

Hei-VAP Plug & Play Precision

Automatic distillations with Hei-VAP Precision hand lift models and valve-regulated vacuum pumps

Hei-VAP Plug & Play Precision 1
- Hei-VAP Precision with hand lift and vertical glassware set G3
- Vapor temperature sensor
- Vacuum valve
- Vacuum pump Rotavac Valve Tec with condenser
- Tube set

P/N 563-61300-00

Hei-VAP Plug & Play Precision 2
- Hei-VAP Precision with hand lift and coated vertical glassware set G3B
- AUTO$_{accurate}$-sensor
- Vacuum valve
- Vacuum pump Rotavac Valve Control with condenser
- Tube set

P/N 563-51310-00

Hei-VAP Plug & Play Safety Upgrade

For highest safety

Hei-VAP Plug & Play Safety Upgrade
Additional guard hood and coating of glassware for your Hei-VAP Plug & Play Package
P/N 569-00311-00

Hei-VAP Plug & Play Premium Cool
P/N 564-31318-00

Hei-VAP Plug & Play Premium

Automatic distillations with Hei-VAP Precision motor lift models and RPM-regulated vacuum pumps

Hei-VAP Plug & Play Premium 1
- Hei-VAP Precision with motor lift and vertical glassware set G3
- AUTO$_{accurate}$-sensor
- Vacuum pump Rotavac Vario Tec with condenser
- Woulff bottle
- Tube set

P/N 564-21300-00

Hei-VAP Plug & Play Premium 2
- Hei-VAP Precision with motor lift and coated vertical glassware set G3B
- AUTO$_{accurate}$-sensor
- Vacuum pump Rotavac Vario Control with condenser
- Woulff bottle
- Tube set

P/N 564-31310-00

Hei-VAP Plug & Play Premium Cool
- Hei-VAP Precision with motor lift and coated vertical glassware set G3B
- AUTO$_{accurate}$-sensor
- Vacuum pump Rotavac Vario Control with condenser
- Woulff bottle
- Chiller RotaChill L
- Tube set

P/N 564-31318-00

Technical Specifications - Rotary Evaporators

Model		Hei-VAP Value (HL) / Value Digital (HL)	Hei-VAP Advantage (HL)	Hei-VAP Advantage (ML)	Hei-VAP Precision (HL)	Hei-VAP Precision (ML)
Hand / Motor lift		hand lift	hand lift	motor lift	hand lift	motor lift
Height adjustment speed		manual	manual	30 mm/s	manual	30 mm/s
Height adjustment	**(mm)**	155	155	155	155	155
Rotation speed	**(rpm)**	10 – 280	10 – 280	10 – 280	10 – 280	10 – 280
Rotation speed setting		scale	3.5" LCD display	3.5" LCD display	4.3" LCD color graphic display	4.3" LCD color graphic display
Drive			brushless DC motor with electronic speed control			
Heating capacity	**(W)**	1,300	1,300	1,300	1,300	1,300
Temp. range heating bath	**(°C)**	20 – 210	20 – 210	20 – 210	20 – 210	20 – 210
Temperature accuracy bath	**(°C)**	±1	±1	±1	±1	±1
Overheat protection bath	**(°C)**		cut-off at 5 °C over set temperature via separate Pt 1000			
Bath temperature setting****		scale / digital	3.5" LCD display	3.5" LCD display	4.3" LCD color graphic display	4.3" LCD color graphic display
Heating bath temperature control		electronic / digital	electronic / digital	electronic / digital	electronic / digital	electronic / digital
Secondary overtemp. cut-off	**(°C)**	250	250	250	250	250
Material heating bath		stainless steel AISI 316L	stainless steel AISI 316L	stainless steel AISI 316L	stainless steel AISI 316L	stainless steel AISI 316L
Diameter heating bath		255	255	255	255	255
Volume heating bath		4.5	4.5	4.5	4.5	4.5
Display vapor temperature		no	yes	yes	yes	yes
required accessories			vapor temperature sensor	vapor temperature sensor	vapor temperature sensor	vapor temperature sensor
Integrated vacuum controller		no	no	no	yes	yes
Timer		no	yes	yes	yes	yes
Vacuum program $SET_{pressure}$**		no	no	no	yes	yes
Vacuum program $AUTO_{easy}$**		no	no	no	yes	yes
Vacuum program $AUTO_{accurate}$ requires $AUTO_{accurate}$-sensor**		no	no	no	yes	yes
Remote control function						
- Lift		no	no	yes	no	yes
- Start rotation		yes	yes	yes	yes	yes
- Start vacuum		no	no	no	yes	yes
- Start heating bath		yes	yes	yes	yes	yes
Programmable ramps		no	no	no	yes	yes
Supply power	**(W)**	1,400	1,400	1,400	1,400	1,400
Weight (w/o glassware assembly)	**(kg)**	16	16	16	17	17
Dimensions with glassware set G3 (l x w x h)	**(mm)**	739 x 490 x 887	739 x 490 x 887	739 x 420 x 887	739 x 490 x 887	739 x 420 x 887
Protection class***	**(DIN EN 60529)**	IP 20	IP 20	IP 20	IP 20	IP 20
Operating conditions	**(°C)**	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity
Rate of evaporation*	**(L/h)**					
- Toluene		8.5	8.5	8.5	8.5	8.5
- Acetone		5.8	5.8	5.8	5.8	5.8
- Ethanol		3.5	3.5	3.5	3.5	3.5
- Water		1.2	1.2	1.2	1.2	1.2
Condensing surface	**(cm^2)**	1,200	1,200	1,200	1,200	1,200

* ΔT of 40 °C between heating bath temperature and boiling temperature
** Only in combination with vacuum systems
*** IP 67 cable connection on heating bath
**** Hei-VAP Value Digital: digital display

Standard supply voltage: 230 V - other voltages upon request, please specify for order

Heidolph
Research made easy

Certificate

To confirm the ability for

continuous operation

of the Hei-VAP Series Rotary Evaporators

Hei-VAP Series Rotary Evaporators feature overtemperature safety circuits according to DIN EN 61010-1:2001 and DIN EN 61010-2-010:2003 and therefore are designed for continuous operation.

This statement is made under the precondition that all units are operated in accordance with the operation manual and in accordance with good practice standards for safety in laboratories, rules for accident preventions, and compliance with directions on hazardous materials.

Schwabach, January 2013

i. V. Jan Welzien
Technical Director

i. V. Stefan Richter
Quality Control Director

Innovative Vacuum Regulation for Rotary Evaporators

Different methods of vacuum regulation in rotary evaporators are compared according to their benefit for the user. Essential criteria of such analysis are process time, rate of solvent recovery, ease of handling, and flexibility. Speed-controlled diaphragm pumps with automatic regulation feature obvious advantages and an extremely long performance life of wear parts.

Fig. 1: Rotary Evaporator, speed-controlled vacuum pump and recirculating cooler as modular system.

Vacuum as a tool in the chemistry laboratory

Over the years, the diaphragm pump has become a standard item in the chemistry laboratory. A variety of applications depend on regulated vacuum pressure. A typical example is the rotary evaporator that requires adequate pressure to get as close as possible to the solvent's boiling point and to evaporate solvents at low temperatures (fig. 1). If pressure is too high, evaporation will take too long and if pressure is too low, the substance may start foaming. The question is how to best regulate pressure either manually or automatically, and if automatically, how? The method of regulation is essential for all aspects of performance, economy, and the environment. Adjusting the hot bath temperature by hand is unheard of today. A skilled user with enough time, could readjust the temperature with a rotary knob just as well as an electronic control circuit but these people are rare in modern labs. Today, instead of mercury thermometer, which only a few people use, electronic controls with PID characteristics as minimum standard are used.

With some patience, the manual system will reveal proper results but most of the users do not want to monitor the pressure for hours. For this point, we need to imagine that a hand-regulated valve will not adjust pressure but suction power. During the evaporation process, temperature and solvent composition change continuously. Hence, boiling pressure drifts and the user must permanently readjust the valve by hand. In today's science with its high cost and little time, such action is not adequate.

As a solution, we need to think about developing automatic vacuum regulators which at least manage to maintain a pressure level once set. This is state-of-the-art today.
A conventional method is flow regulation by a 2-point solenoid valve. The pump runs at full power all the time and as soon as the actual pressure exceeds a selected nominal value (nominal plus hysteresis), the valve opens and the system is evacuated suddenly until nominal pressure drops below the nominal value. Used with appropriate knowledge and care, such systems will deliver acceptable results. Simple regulators involve problems with pressure "undershoot" or "flutter", which may cause foaming or boiling-over of the solvent. Another problem is that such systems with their typical high hysteresis work above their optimum operating pressure most of the time. Low efficiency goes hand-in-hand with long evaporation times and, moreover, most of the usual vacuum regulators do not really work automatically, and the user needs to know and select the adequate nominal pressure and hysteresis. Unfortunately, such values are different for every solvent mix and temperature.

Once the evaporation has started, the temperature in the evaporating flask is determined by the heating power of the hot bath and the evaporation heat of the solvent and, hence, by the quantity of the solvent. Some manufacturers try to compensate for this fact with pressure steps or ramps; this in turn increases the number of vacant parameters that need to be programmed in the controller. How should the user know about the optimum pressure curve? These systems are unable to detect and control boiling pressure levels automatically. Such control action would not be reasonable with a "coarse" method of vacuum regulation, i.e. not using more than one single "open/close" valve.

Fig. 2: speed-controlled diaphragm pump for Heidolph rotary evaporators

Speed-controlled vacuum pump systems with fully automatic controller

This approach features continuous vacuum regulation by a speed-controlled motor driving a diaphragm pump. This concept is simple; the economic realization of a frequency control requires detailed technical knowledge. Last but not least, integration of a PID controller will show all of its talents: undershoot, overshoot and similar deviations are history (fig. 2: Rotavac Vario Control, by Heidolph Instruments). Evaporation and drying are intricate processes influenced by a variety of parameters. Simple sequencers for speed-controlled diaphragm pumps hardly show any advantages over "open/close" valves since they also depend on the user programming nominal pressures.
Fully automatic regulators detect boiling points (based on vapor temperature), or boiling points of various substances in the solvent. They approach these points "softly" without any overshoot and follow-up temperature changes in the hot bath. The regulator exactly controls pressure as required by the specific boiling point to achieve the shortest possible process.

Comparison: "open/close" valve against fully automatic speed control

The principle of continuous vacuum regulation is shown in fig. 3. Instead of the typical flutter of the actual pressure around nominal values which is typical for an "open/close" valve control, a continuous approach and follow-up of boiling pressure is reached.

The figures show time saving: When using a speed-controlled system with boiling-pressure follow-up in comparison with a conventional "open/close" valve control without boil pressure follow-up, conditions of test show identical. Used configuration: Hei-VAP Precision with program AUTO$_{accurate}$.

Distillation is faster when using a speed-controlled system with boiling-pressure follow-up. This time saving will cut down process times and, hence, cost. Integrating daily labor cost while using conventional pump stations in a "cost of ownership" calculation, speed-controlled systems with boiling-point follow-up turn out to be the most effective ones.

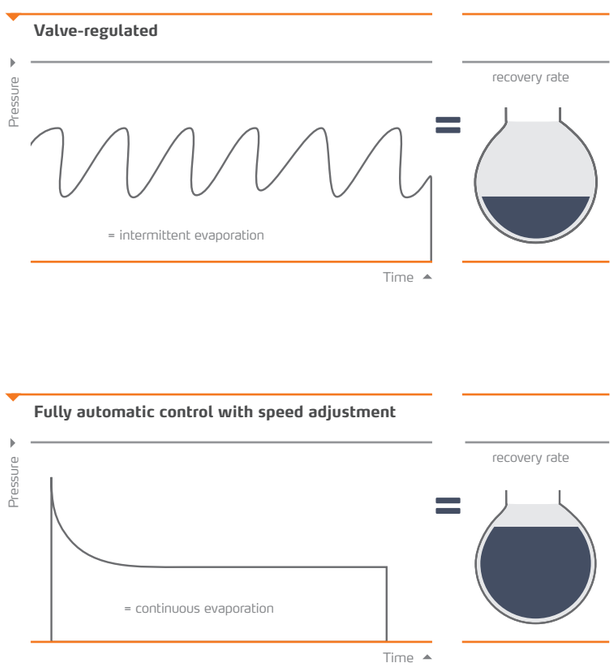


Fig. 3: schematic pressure curve: "open/close" valve control – VARIO-system

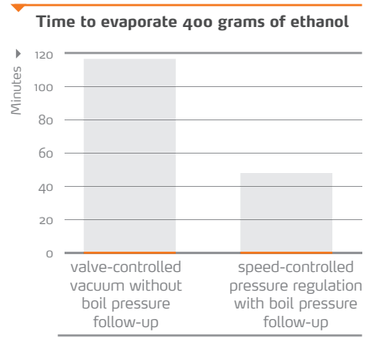


Fig. 4: time to evaporate a solvent: "open/close" valve – speed-controlled system

The speed-controlled system allows for highly efficient distillation. The solvent recovery rate is close to 100 %, a value hardly achieved with a simple manual "regulation" or programmed pressure steps. With "open/close" valve systems, a significant quantity of solvent gets into the pump when undershooting nominal pressure which in turn will cause condensation problems in the housing and valves. In particular, 2-cylinder diaphragm pumps are prone to condensation and need gas ballast that in turn affects final pressure. The only solution is a 3-stage pump, preferably with speed control.
In addition to its extraordinary regulating properties, a speed-controlled pump features even more benefits for the user. The pump runs only when needed, i.e. at minimum speed of a few Hertz only, which means low noise, low vibration, extended performance life of diaphragm and valves. Performance life of a diaphragm is expressed in strokes. A 10,000-hour performance life of the diaphragm (at 50 Hz) will mean many years of trouble-free operation of Vacuubrand diaphragm pumps in speed-controlled systems.

Acknowledgment
We would like to thank Dr. Jürgen Dirscherl, engineering director of Vacuubrand, for his friendly support and supply of information.

Wolf Laboratories Limited

www.wolflabs.co.uk

Wolflabs

Tel: 01759 301142 Fax:01759 301143 sales@wolflabs.co.uk

Use the above details to contact us if this literature doesn't answer all your questions.

Pricing on any accessories shown can be found by keying the part number into the search box on our website.

The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct. If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.