

# Solvent Evaporation

## Fast, reliable and affordable



### Instruments

TurboVap® II  
TurboVap® LV  
TurboVap® 500  
TurboVap® 96  
Biotage® SPE Dry 96  
Biotage® V-10 Evaporator

# Fast, Automated and Safe Drying of Solvents

The widest range of evaporation solutions available

Biotage offers the widest range of solvent evaporation systems available. This guide presents the most suitable evaporation system for your research requirements, and answers common questions regarding service, maintenance and applications.

Evaporation systems can be found in virtually every type of laboratory, from drug discovery to analytical chemistry. Biotage evaporation instruments are commonly used in many applications and have been the market's preferred choice for decades.

For synthesis reactions the unique Biotage® V-10 Evaporator offers a speedy solution for both HPLC fractions and high boiling solvent removal. Its automatic capabilities makes the V-10 Evaporator a work horse for today's drug discovery industries.

In clinical and hospital labs, general sample preparation is common practice and together with Biotage ISOLUTE® and EVOLUTE® products we offer a complete solution for everyday evaporation and sample preparation needs. TurboVap® LV can accommodate a variety of sample sizes and formats to adopt your most common work practices.

In the environmental field, larger samples and low concentrations are often big hurdles. Biotage TurboVap II and TurboVap 500 offer a complete solution for both concentrations into smaller volumes or complete evaporation prior to analysis.

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# Biotage Evaporation System Selection Guide

	Sample capacity	Sample volume	Key applications	Typical solvents	Heating	Technology
<b>TurboVap® II</b> 	6	50 mL or 200 mL	Food, water, soil and environmental solvent extraction.	<ul style="list-style-type: none"> <li>Acetone</li> <li>Acetonitrile</li> <li>Methanol</li> <li>Dichloromethane</li> <li>Toluene</li> </ul>	Water bath (RT to 90 °C)	Gas vortex shearing technology sensor endpoint detection with either 0.5 mL or 1.0 mL endpoint stems.
<b>TurboVap® II ASE version</b> 	6	40 mL	Food, water, soil and environmental solvent extraction.	<ul style="list-style-type: none"> <li>Acetone</li> <li>Acetonitrile</li> <li>Methanol</li> <li>Dichloromethane</li> <li>Toluene</li> </ul>	Water bath (RT to 90 °C)	Gas vortex shearing technology sensor endpoint detection with either 0.5 mL or 1.0 mL endpoint stems.
<b>TurboVap® LV</b> 	50	From 1.5 mL to 30 mL	Forensic, clinical chemistry, food, and pharmaceutical laboratories for concentration of solvents following SPE cleanup of drug samples or pesticide extracts.	<ul style="list-style-type: none"> <li>Acetonitrile</li> <li>Ethylacetate</li> <li>Hexane</li> <li>Methanol</li> <li>Dichloromethane</li> </ul>	Water bath (RT to 90 °C)	Gas vortex shearing technology.
<b>TurboVap® LV ASE version</b> 	24	40 mL or 60 mL ASE tubes	Food, water, soil and environmental solvent extraction.	<ul style="list-style-type: none"> <li>Acetonitrile</li> <li>Ethylacetate</li> <li>Hexane</li> <li>Methanol</li> <li>Dichloromethane</li> </ul>	Water bath (RT to 90 °C)	Gas vortex shearing technology.
<b>TurboVap® 500</b> 	2	500 mL	Larger samples, water testing in remote locations with simple lab equipment. Comes with solvent recovery functionality as default.	<ul style="list-style-type: none"> <li>Acetone</li> <li>Hexane</li> <li>Methanol</li> <li>Dichloromethane</li> </ul>	Water bath (RT to 95 °C)	Gas vortex shearing technology sensor endpoint detection with either 0.5 mL or 1.0 mL endpoint stems.
<b>TurboVap® 96</b> 	96 x 2	Up to 2 mL	Genomic and proteomic applications that require concentration of purified extracts. Widely used for drugs of abuse and other pharmaceutical SPE methods.	<ul style="list-style-type: none"> <li>Acetonitrile</li> <li>DMSO (Dimethyl sulfoxide)</li> <li>Methanol</li> <li>DMF (Dimethyl formamide)</li> <li>THF (Tetrahydrofuran)</li> </ul>	Heat block	Gas vortex shearing technology.
<b>Biotage® SPE Dry</b> 	24, 48, 96, and 384 well microplates	Up to 10 mL (depending on format)	Forensic, clinical chemistry, food, and pharmaceutical laboratories for concentration of solvents following SPE cleanup of drug samples or pesticide extracts.	<ul style="list-style-type: none"> <li>Acetonitrile</li> <li>DMF</li> <li>Methanol</li> <li>Propan-2-ol</li> <li>DMSO</li> </ul>	Gas (RT to 80 °C)	Heated gas delivery above and below wells speeds evaporation.
<b>Biotage® V-10</b> 	1	Up to 12 mL (depending on vial)	High BP solvents, reversed phase HPLC fractions.	Almost all solvents, especially good for: <ul style="list-style-type: none"> <li>DMF</li> <li>DMSO</li> <li>MeCN + water</li> <li>MeOH + water</li> <li>NMP</li> </ul>	Heated air	Patented 3-way evaporation including simultaneous heat, vacuum, and high speed vial rotation.

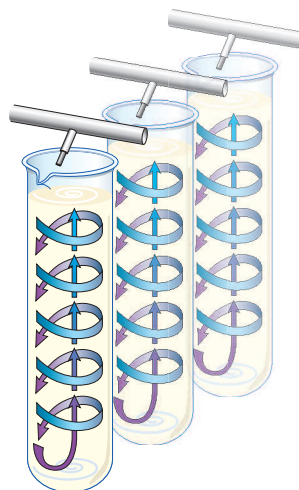
# TurboVap® Technology

## Highest performance, every time

Starting with innovative engineering, TurboVap systems from Biotage are designed with extensive customer input and testing. The result: industry-standard design and the highest performance in every way. TurboVap evaporators utilize a water bath system, providing higher efficiency and control and, unlike old heating blocks, consistently delivers fast and even results.

### Highly Efficient, Patented Gas Vortex Shearing Technology

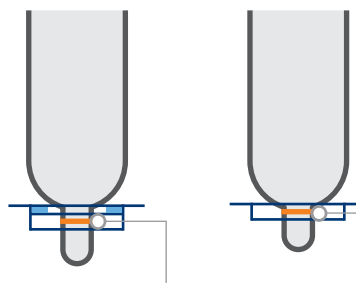
The patented vortex evaporation design makes evaporation up to 10x faster compared to other techniques. The vortex created by the moving gas travels down the tube to the solvent surface, where it increases the gas/solvent interface—providing faster evaporation than conventional methods. The combination of gas flow and temperature control is used to optimize the sample drying. Nitrogen is recommended as the best choice of gas because it is inert and minimizes the risk of oxidation. A clean oil-free compressed air supply at 60 psi can be used if the sample is stable and/or nitrogen is not available.



**Figure 1.** Principle of the gas vortex shearing technology. The position of the gas nozzle close to the tube wall is important for optimized evaporation.

### Automated Evaporation Completion

The patented sensor technology alerts you with an audible alarm when evaporation is complete. This prevents the sample from going dry and volatiles from being lost. Sensor end-point detection is available with either 0.5 mL or 1.0 mL end-point stems.



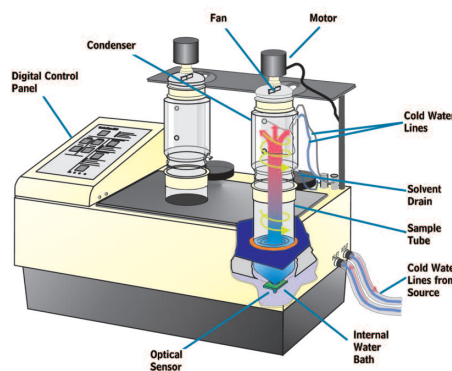
**Figure 2.** The selection between 0.5 mL and 1 mL end-point detection is easily done with a quick modification of spacers.

0.5 mL mark  
and 0.5 mL end-point.

1 mL mark  
and 1 mL end-point.

### Fast, Consistent and Even Results

The TurboVap 500 does not require a fume hood or external gas supply for operation. It is designed as a closed system with up to 95% solvent recovery function for safe and economic waste handling.



**Figure 3.** The helical flow establishes a vortex action that promotes sample homogeneity and continuous rinsing of the tube wall.

# TurboVap® Family

Choose the solution that's right for you

## TurboVap II

The TurboVap II Concentration Evaporator Workstation is a microprocessor-controlled concentrator for unattended, automated sample evaporation.

- Unattended and automated
- Optical sensor endpoint detection
- 6 individually controlled vial positions
- No fume hood needed



## TurboVap LV

The TurboVap LV (Low Volume) Concentration Evaporator Workstation offers many interchangeable tube racks giving you the flexibility for automated low volume sample preparation. The microprocessor-controlled monitoring system regulates timed operation, water bath temperature, automatic gas shutoff and operational diagnostics.

- 50 positions with user selectable racks for greater flexibility
- 1.5–30 mL volume



## TurboVap 500

The TurboVap 500 Concentration Evaporator Workstation is a closed-cell evaporation system that delivers automated sample concentration and solvent recovery using helical gas flow and sensor endpoint detection technology. Solvent vapors are collected by the condensers on the side walls for waste or reclamation.

- 2 individually controlled positions
- 500 mL volume
- 0.5 or 1.0 mL endpoint stems
- No fume hood needed



## TurboVap 96

The TurboVap 96 Concentration Evaporator Workstation is a microprocessor-controlled evaporation system for simultaneous, automated and unattended concentration of multiple samples.

- 2 positions with individual gas regulation
- Compatible with 96-well standard or deep well plates



Easy-to-use programming interface with individual tube control.

Glass window enables easy overview of the evaporation progress.

Adjustable pressure regulator ensures optimal evaporation. (Not visible.)

End-point detection terminates evaporation at 0.5 mL or 1.0 mL volumes.



## TurboVap® II

Volume range 50 mL or 200 mL

TurboVap II increases the capacity and sample throughput in laboratories, eliminates concentration bottlenecks and maintains quality and lower costs.

This instrument has 6 sample positions and enables the user to evaporate to solid state or concentrate into a fixed end-point volume. The small footprint of TurboVap II makes it the ideal choice in today's laboratories. It takes up only a fraction of the bench space used by conventional rotary evaporators and can even be used outside a fume cupboard by using the integral vent tube.

### Applications

The TurboVap II Evaporation System efficiently concentrates samples prior to analysis by LC/MS or other analytical instruments. Optical sensors automatically stop gas flow when evaporation has reached its end-point, thereby eliminating the risk of drying and loss of volatile compounds. The TurboVap II is suitable for evaporation of large volumes after liquid-liquid extractions.

TurboVap II is available in a Dionex ASE compatible setup which accommodate the use of six 40 mL stemmed and graduated Dionex ASE tubes. Upgrade kits are also available for converting your old TurboVap II.

## Advantages

- Proven equivalency with EPA methods
- Patented vortex shearing technology
- Patented sensor endpoint detection—no monitoring required
- Unattended operation for 1–6 samples
- Controlled water bath is adjustable from ambient to 90 °C
- Operators are free to perform other tasks while evaporation is running
- User friendly displays and diagnostics
- Convenient bench top size—no hood space required

## Applications

- Pharmaceutical biotech compounds
- Clinical samples
- Environmental samples
- Forensic and crime samples
- Drugs of abuse samples
- Food and beverage analysis
- Agrochemical samples

## Specifications

<b>Technology</b>	Gas vortex shearing evaporation with sensor endpoint detection. Available with either 0.5 mL or 1.0 mL endpoint stems
<b>Number of samples</b>	1-6
<b>Timer range</b>	1 to 99 min. or 0.1 to 9.9 hrs.
<b>Max. sample volume</b>	200 mL
<b>Final endpoint volumes</b>	0.5 or 1 mL
<b>Solvent reclamation</b>	–
<b>Water bath capacity</b>	6.4 L of distilled water
<b>Water bath temp.</b>	Ambient to 90 °C (Upper temperature with sensors is 60 °C)
<b>Gas supply requirements</b>	Minimum inlet pressure 30 psi, 2.1 bar Maximum inlet pressure 80 psi, 5.5 bar
<b>Gas consumption</b>	At 11 psi: 0.08 cfm/nozzle or 2.3 L/min/nozzle
<b>Exhaust</b>	25 CFM blower with 5.1 cm (2") venting exhaust (tube supplied)
<b>Power requirements</b>	100/120 VAC model 200/220 VAC model 105–132 VAC 198–292 VAC 900 VA max 900 VA max 50/60 Hz
<b>Fuses</b>	100/120 VAC model: 10A (1 pcs), T250V 220/240 VAC model: 5A (2 pcs), T250V
<b>Dimensions (WxDxH)</b>	53.8 x 30.5 x 30.5 cm 21.2" x 12" x 12"
<b>Weight</b>	18.4 kg/40.5 lbs
<b>Certifications</b>	2006/95/EC Low Voltage Directive 2004/108/EC EMC Directive 93/68/EEC CE Marking Directive

## Evaporation Rates (180 mL solvent)

Solvent	Bath temp. (°C)	Gas pressure (psi)	Approx. time (min.)
Dichloromethane	40	10	35
Hexane	55	10	23
Acetone	55	10	27
Methanol	50	12	70
Acetonitrile	50	12	75
Toluene	50	10	90
Water	90	18	120



Each row of nozzles can be controlled individually, with indicator control for each line.

Adjustable pressure regulator ensures optimal evaporation. (Not visible.)

50 (standard) or 24 (ASE version) nozzles.

## TurboVap® LV

Volume range up to 60 mL

The TurboVap LV evaporation system is an automated high speed, low volume sample concentrator. It is an efficient alternative to the inconvenient set-up, constant monitoring and long evaporation times that are characteristic of conventional techniques.

With the TurboVap LV system, you simply “load and leave”. A water bath gives an even temperature and gas flow is delivered over a set time period. Turn on 1 to 5 manifolds depending on the number of samples and the timer will alert you when your samples are ready.

### Applications

The TurboVap LV is commonly used for evaporation of solvents following solid phase extraction clean-up of drug samples or pesticide extracts. It is ideal for sample volumes of 1 mL to 30 mL that need to be evaporated in GC vials, microcentrifuge tubes, conical bottom tubes or test tubes. It offers a high throughput solution with 50 sample positions using the standard range of Biotage racks.

The TurboVap LV can be used in conjunction with the RapidTrace®+ Automated SPE workstation that collects extracts in 12 x 75 mm, 13 x 100 mm, or 16 x 100 mm test tubes.

For acidic solutions, Biotage offer PTFE coated nozzles to prevent corrosion. For volumes greater than 30 mL, an ASE compatible version of the TurboVap LV is available for use in conjunction with Dionex ASE 200 columns.



## Advantages

- Patented vortex shearing technology
- Proven compliance with EPA methods
- 10x faster than centrifugal evaporators
- 3x faster than hot blocks
- 2x faster than conventional N<sub>2</sub> blow down
- Unattended operation for up to 50 samples
- Twelve racks available for tube sizes from 1.5 mL to 30 mL
- Controlled water bath adjustable from ambient to 90 °C
- Built-in nitrogen regulator
- Unattended operation improves lab productivity
- User-friendly displays and diagnostics
- Convenient size—no hood space required
- No tube balancing required
- Easily swap racks to change between different tube sizes
- Requires no additional equipment such as vacuum pumps and vacuum traps

## Applications

- Pharmaceutical biotech compounds
- Clinical samples
- Environmental samples
- Forensic and crime samples
- Drugs of abuse samples
- Food and beverage analysis
- Agrochemical samples

## Specifications

<b>Technology</b>	Gas vortex technology
<b>Number of samples</b>	50
<b>Gas control</b>	Gas can be turned on to each of five independent manifolds when working with fewer than fifty samples. Gas regulator and gas gauge range from 0 to 20 psi, 0 to 2 bar.
<b>Timer range</b>	1 to 99 minutes, 0.1 to 9.9 hours, or infinite
<b>Max. sample volume</b>	30 mL (60 mL with ASE version)
<b>Final endpoint volumes</b>	–
<b>Solvent reclamation</b>	–
<b>Water bath temp.</b>	Ambient to 90 °C. Temperatures below ambient can be regulated using the cooling effect of the evaporation process
<b>Gas supply requirements</b>	Minimum inlet pressure 60 psi, 4.1 bar Maximum inlet pressure 100 psi, 6.9 bar
<b>Gas consumption</b>	At 10psi: 0.06 cfm/nozzle or 0.6 cfm/row of 10 nozzles or 1.699 L/min/nozzle At 15psi: 0.1 cfm/nozzle or 1 cfm/row of 10 nozzles or 2.83 L/min/nozzle
<b>Exhaust</b>	5.1 cm (2") venting exhaust (tube supplied)
<b>Power requirements</b>	110/120 VAC at 60 Hz (European, 230 VAC at 50 Hz)
<b>Fuses</b>	100/120 VAC model 200/220 VAC model 1 ea 10A, Slow, 250V 2 ea 5A, Slow, 5 x 20 mm, 250V
<b>Dimensions (WxDxH)</b>	53.8 x 30.2 x 30.2 cm 21.2" x 11.9" x 11.9"
<b>Weight</b>	18.4 kg/40.5 lbs
<b>Certifications</b>	2006/95/EC Low Voltage Directive 2004/108/EC EMC Directive 93/68/EEC CE Marking Directive

## Evaporation Rates (10 mL solvent)

Solvent	Bath temp. (°C)	Gas pressure (psi)	Approx. time (min.)
Hexane	35	12	19
	50	12	11
	60	12	7
Acetonitrile	35	12	55
	50	12	32
	60	12	22
Dichloromethane	35	12	20
	70	12	15
	70	12	7
MeCN/water	70	12	65
Ethylacetate	35	12	35
	50	12	15
	60	12	10
	70	12	7

Solvent	Bath temp. (°C)	Gas pressure (psi)	Approx. time (min.)
Methanol/water	70	12	65
	35	12	50
	50	12	26
	60	12	18
Water	50	12	210
	60	12	140
	70	12	100

Vortex shearing motor requires no gas supply for operation.

Easy-to-use operation interface for time, temperature and end-point detection settings.

Built-in chiller for solvent recovery.

Endpoint sensors for 0.5 or 1 mL evaporation.



## TurboVap<sup>®</sup> 500

Volume range up to 500 mL

The TurboVap 500 can evaporate volumes up to 500 mL down to complete dryness with flat bottomed vessels or to a selectable endpoint at 0.5 or 1 mL. A water bath is used to maintain stable temperature, while the cooled glassware condenser collects the solvent. The condenser technology allows for efficient and cost effective collection of hazardous waste. It also prevents losses of samples and allows for analysis to detect cross-contamination issues.

### Applications

In environmental laboratories, concentration of large samples is often a time consuming process. TurboVap 500 efficiently concentrates organic solvent extracts to 0.5 or 1.0 mL and sounds an alarm when finished. This "load and leave" capability frees the analyst for more important work.

TurboVap 500 is also an excellent alternative to traditional rotary evaporators used in organic synthesis. With a 500 mL solvent capacity and water bath temperatures up to 95 °C, synthesis mixtures are processed quickly. The unique vortexing action maintains the components of interest in the solvent during evaporations and minimizes the "plating" of the compounds on the vessel walls. The open top cylindrical design of the sample tube, with a small stem at the bottom, provides an easy way to recover the products of interest when the evaporation is completed.

## Advantages

- Patented vortex shearing technology
- Patented sensor endpoint detection
- Operators are freed to perform other tasks, further improving lab productivity
- No “bumping” means no re-working of samples, saving you money every week
- Solvent vapor recovery system—laboratory emissions can be greatly reduced
- User-friendly displays and diagnostics
- Convenient bench top size—no hood space required
- No need for fume hood
- Portable—no gas required

## Applications

- Environmental samples
- Agrochemical samples
- Forensic and crime samples
- Drugs of abuse samples
- Food and beverage analysis
- Pharmaceutical biotech compounds
- Clinical samples
- Remote locations

## Specifications

<b>Technology</b>	Gas vortex shearing technology
<b>Number of samples</b>	2
<b>Timer range</b>	1 to 99 minutes
<b>Max. sample volume</b>	500 mL
<b>Evaporation rate</b>	Adjustable based on water bath temperature, fan speed and chiller or tap water temperature
<b>Final endpoint volumes</b>	Selectable. Automatic endpoints of 0.5 mL and 1.0 mL or dryness.
<b>Solvent reclamation</b>	95% of solvent vapors under typical conditions
<b>Water bath temp.</b>	Ambient to 95 °C (Upper temperature with sensors is 60 °C)
<b>Gas supply requirements</b>	Internal fan, 4000–8000 rpm No external gas required
<b>Exhaust</b>	–
<b>Minimum operating pressure</b>	No gas required
<b>Power requirements</b>	110/120 VAC at 60 Hz (European, 230 VAC at 50 Hz) 900 VA max
<b>Fuses</b>	100/120VAC model: 10A (1 pcs), T250V 220/240 VAC model: 5A (2 pcs), T250V
<b>Dimensions (WxDxH)</b>	61 x 30.2 x 53.8 cm 24" x 11.9" x 21.2"
<b>Weight</b>	18.4 kg/40.5 lbs
<b>Certifications</b>	2006/95/EC Low Voltage Directive 2004/108/EC EMC Directive 93/68/EEC CE Marking Directive

## Evaporation Rates

Solvent	Solvent volume (mL)	Bath temp. (°C)	Fan speed (rpm)	Chiller temp. (°C)	Approx. time (min.)
Dichloromethane	100	38	4000	6	15
	100	38	6000	6	10
	100	38	8000	6	7
	180	38	4000	6	37
	180	38	6000	6	25
Hexane	50	58	6000	6	4
	100	58	6000	6	7
	180	58	6000	6	13
	500	58	6000	6	33

Solvent	Solvent volume (mL)	Bath temp. (°C)	Fan speed (rpm)	Chiller temp. (°C)	Approx. time (min.)
Methanol	100	58	6000	6	25
Acetone	100	56	6000	6	12
Acetonitrile	100	58	6000	6	23
Acetone/hexane (50:50)	100	58	6000	6	9
Water	100	75	8000	6	100
Methanol/water (50:50)	100	58	8000	6	43



Easy-to-use interface for time and temperature operation. Individual control for each compartment.

Unique nozzle design ensures fast and efficient vortex shearing evaporation.

Adapters support different plates and depths.

Dual gas regulators, one for each plate, operated individually for greater flexibility.

## TurboVap® 96

### Deep or shallow 96-well plates

The TurboVap 96 Concentration Workstation is a high speed concentrator designed to work with 96-well microplates and deep-well plates. It is an efficient alternative to the constant monitoring and long evaporation times that are characteristic of conventional techniques—with the added bonus of unattended operation.

The evaporation process is driven by Biotage's patented gas-vortex action, further enhanced by a temperature controlled environment and adjustable gas flow rates. This combination saves time, bench space and operating costs while improving the evaporation speed and sample-to-sample consistency.

#### Applications

The TurboVap 96 has two independent compartments that accommodate 1 mL or 2 mL standard or deep well plates. Each compartment has independent control of gas flow and temperature. The flow rate of the gas is determined by the volume of solvent in the plate and the temperature values can be set with the help of an evaporation guide supplied. Nozzles are easy to clean and require minimal maintenance.

In genomic and proteomic applications, the evaporation of DMSO from plates is a common application. As is drying HPLC aqueous solvent mixtures of methanol or acetonitrile. The TurboVap 96 complements automated 96-well SPE workstations that are widely used for drugs of abuse determination and other pharmaceutical SPE methods.

## Advantages

- Patented vortex shearing technology
- Operators are free to perform more important tasks, further improving lab productivity
- No “bumping” means no re-working of samples, saving you money every week
- User-friendly displays and diagnostics
- Convenient bench top size—no hood space required

## Applications

- Pharmaceutical biotech compounds
- Clinical samples
- Environmental samples
- Forensic and crime samples
- Drugs of abuse samples
- Food and beverage analysis
- Agrochemical samples

## Specifications

<b>Technology</b>	Gas vortex shearing technology
<b>Number of samples</b>	2 x 96 well plates, standard or deep with adapters
<b>Format</b>	8 x 12 well microplates and deep-well plates
<b>Timer range</b>	1 to 99 minutes
<b>Max. sample volume</b>	<2 mL
<b>Final endpoint volumes</b>	–
<b>Capacity</b>	2 standard 96 well microplates or deep-well plates
<b>Heaters</b>	Two internal individually controlled heaters. Each adjustable from ambient to 80±5 °C
<b>Gas supply requirements</b>	Minimum inlet pressure 30 psi (2.1 bar) Maximum inlet pressure 80 psi (5.5 bar)
<b>Range</b>	5–99 cfm
<b>Exhaust</b>	25 CFM blower with 5.1 cm (2") venting exhaust (tube supplied)
<b>Minimum operating pressure</b>	70 psi
<b>Power requirements</b>	100/120VAC 50/60 Hz 220/240 VAC50/60 Hz 620 VA rated power
<b>Fuses</b>	100/120VAC model: 6A , T250V 220/240 VAC model: 3A, T250V
<b>Dimensions (WxDxH)</b>	30.5 x 30.5 x 61 cm 12" x 12" x 24"
<b>Weight</b>	18.4 kg/40.5 lbs
<b>Certifications</b>	2006/95/EC Low Voltage Directive 2004/108/EC EMC Directive 93/68/EEC CE Marking Directive

## Evaporation Rates<sup>1</sup>

Solvent	Solvent volume (uL)	Heater temp. (°C) <sup>2</sup>	Gas flow rate (cubic ft/hr.)	Time to evap. to dryness <sup>3</sup>
Methanol	500	70	60	12 min.
Water	500	80	60	70 min.
Acetonitrile	500	70	60	25 min.
Acetonitrile/water (50:50)	1000	60	70	1.75 hrs.
THF (Tetrahydrofuran)	1000	50	50	100–15 min.
DMF (Dimethylformamide)	1000	80	70	50 min.
DMSO (Dimethyl sulfoxide)	250	70	60	3 hrs.

<sup>1</sup> Above studies were conducted with clean solvent in a standard 2 mL polypropylene 96 well, deep well microplate.

<sup>2</sup> Not the temperature of the solvent in the well.

<sup>3</sup> The conditions set on the TurboVap (temperature and flow rate) may not be optimum settings for most efficient evaporation rates.



Individual control for upper and lower sections.

PTFE coated needles available as option when evaporating acids and harsh solvents.

Modular design for easy swap between different nozzle configurations.

Available with single or dual configurations.

Easy adjustment of nozzle heights for optimal evaporation conditions for all plates.

Heated gas flow ensures faster evaporation, especially for high boiling point solvents.

## Biotage® SPE Dry

### Deep or shallow 24-, 48-, 96-, and 384-well plates

The SPE Dry 96 and SPE Dry 96 Dual Sample Concentrators are suitable for evaporation of microplate samples across a broad range of formats. By delivering heated gas above and below each well, SPE Dry 96 systems dry samples quickly maintaining tight temperature control at user selected settings. Designed for high throughput sample processing, SPE Dry systems have simple front panel controls and use removable gas delivery assemblies for fast adjusting and cleaning.

#### Versatile formats

SPE Dry is designed with novel technology and a simple interface to produce uniform and reproducible evaporation. The design has a small footprint to fit easily in the fume hood. The heating mechanism is designed to rapidly heat without overshooting the temperature, preventing degradation of temperature sensitive compounds.

Standard SPE Dry 96 and SPE Dry 96 Dual systems are supplied with stainless steel needles. For high purity work, or applications that require particularly aggressive solvents, PTFE coated needles are available. Both needle types can be individually replaced should they become damaged or corroded.

SPE Dry is available in single or dual format and adapts easily to 24-, 48-, 96-, and 384-well microplate formats.

## Advantages

- Efficient evaporation through heated gas flow above and below collection plate
- Precise temperature control and gas flow with reproducible evaporation times
- Compact design
- Easy to use
- Suitable for 24-, 48-, 96- and 384-well microplates

## Specifications

<b>Technology</b>	Heated gas delivery above and below wells speeds evaporation
<b>Number of samples</b>	Models for one or two 96 well plates
<b>Format</b>	8 x 12 well microplates and deep-well plates
<b>Timer</b>	Manual
<b>Max. sample volume</b>	10 mL collection plates
<b>Final endpoint volumes</b>	–
<b>Capacity</b>	24, 48, 96 or 384 well plates
<b>Water bath temp.</b>	60 °C (upper head) 80 °C (lower head)
<b>Gas supply requirements</b>	Minimum 15 psi, maximum 60 psi
<b>Gas flow</b>	Operating flow rate 25 to 100 L per minute (LPM)
<b>Exhaust</b>	–
<b>Power requirements</b>	100/120 VAC 50/60 Hz 220/240 VAC 50/60 Hz 405 W nominal power
<b>Fuses</b>	5A T250V
<b>Dimensions (WxDxH)</b>	25.4 x 38.1 x 40 cm (dual) 10" x 15" x 15.7" 24.2 x 30.6 x 40 cm (single) 9.5" x 12" x 15.7"
<b>Weight</b>	13.9 kg/31 lbs
<b>Certifications</b>	EN61326 (1997 w/A1: 98 & A2: 01) Class A

## Evaporation Rates<sup>1</sup> (minutes)

Solvent	40 °C <sup>2</sup>		60 °C <sup>2</sup>	
	500 µL <sup>3</sup>	1 mL <sup>4</sup>	500 µL <sup>3</sup>	1 mL <sup>4</sup>
Methanol	14	28	11	20
Water	90	165	46	86
Methanol/water (50:50)	46	95	28	56
Propan-2-ol	16.5	26	11.5	16.5
Acetonitrile/water (50:50)	51	60	31	36
Methanol/acetonitrile (50:50)	19	24	12	15

Solvent	40 °C <sup>2</sup>		60 °C <sup>2</sup>	
	500 µL <sup>3</sup>	1 mL <sup>4</sup>	500 µL <sup>3</sup>	1 mL <sup>4</sup>
Acetonitrile	17	20	12	15.5
Methanol/(v/v) 1% NH <sub>4</sub> OH	18	28	13.5	16
DMF	73	105	33	41
Methanol/dichloromethane (50:50)	12	15.5	7.5	9.5
Dichloromethane (v/v) 1% NH <sub>4</sub> OH	8.5	11.5	6	8

<sup>1</sup> Experiments were conducted with flow rate at 50 liters/minute at the upper manifold and 30 liters/minute at the lower manifold.

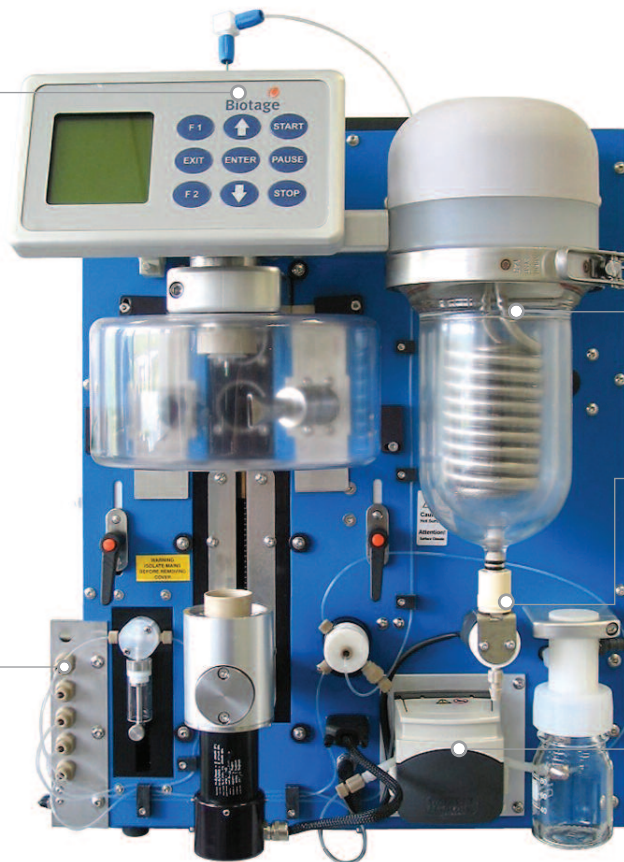
Drying gas used was compressed air. Only standard moisture trap was used within the system. Moisture content of ambient air will effect results.

<sup>2</sup> Temperatures refer to the upper head. Bottom unit was 20 °C higher.

<sup>3</sup> 500 µL volumes were in a 1 mL collection plate.

<sup>4</sup> 1 mL volumes were in a 2 mL collection plate.

Access to 8 built-in methods.



-20 °C condenser captures solvent vapors.

Automatic condenser drain reduces maintenance.

Optional syringe pump and used when re-dissolving.

Optional peristaltic pump for large sample volume transfer.

## Biotage® V-10 Evaporator

Volume range 1 mL to 12 mL

The Biotage V-10 solvent evaporation system rapidly dries samples dissolved in both aqueous and organic solvents up to 20x faster than traditional rotary or centrifugal evaporators.

A patented combination of drying techniques, including high-speed vial rotation, uniform IR controlled heating, and vacuum drying, allows for both rapid evaporation and low temperature evaporation of high boiling solvents. Pre-defined evaporation methods have been optimized to protect the sample against overheating or bumping whilst still maintaining maximum evaporation speed.

### Master of versatility

The versatility of the V-10 enables rapid evaporation of single samples up to 12 mL or larger pooled volumes by using the V-10 integrated pumps. The carousel accessory enables unattended evaporation of up to 16 samples.

The V-10 is the ideal system for evaporation of solvents from prep HPLC fractions. Speed up your analysis step with rapid evaporation directly into a suitable vial for down stream processing. Fractionate directly into vials compatible with the V-10, or pool up the fraction racks and use our automation software *Control Centre* to integrate the entire evaporation process.

With the use of a liquid handling robot, the instrument can combine multiple fractions/samples from different test tube racks and dry them into a single vial in one operation.



## Advantages

- Patented rapid three-way drying: heating, vacuum, rotation
- Evaporation of high boiling solvents
- Versatile and automated
- Clean and safe operation
- Eliminates reformatting
- Enhanced green chemistry
- Simple operation
- Compact footprint

## Applications

- Pharmaceutical compound registration
- Synthetic intermediate isolation
- Synthetic intermediate redissolve
- Evaporation of high boiling point solvents

## Specifications

<b>Technology</b>	Patented, 3-way evaporation including simultaneous heating, vacuum, and high speed vial rotation
<b>Number of samples</b>	1-16 (with carousel)
<b>Sample delivery</b>	5 mL syringe pump and/or peristaltic pump
<b>Max. sample volume</b>	30 mL (single vial)
<b>Vial size compatibility</b>	4 mL (3 variants), 8 mL HPLC vial, 16 mL vial, 20 mL scintillation vial, 30 mL scintillation vial
<b>Final endpoint volumes</b>	User selectable volumes
<b>Solvent reclamation</b>	Up to 98% of solvent vapors under typical conditions
<b>Gas supply requirements</b>	Nitrogen (when using pump for solvent delivery)
<b>Exhaust</b>	Double trapping
<b>Vacuum operating range</b>	Ambient to 2 mbar
<b>Power requirements</b>	110 V, 60 Hz, 15 Amps 100 V, 50/60 Hz, 15 Amps 230 V, 50 Hz, 8 Amps
<b>Fuses</b>	8 Amps (Europe) 15 Amps (US, Japan)
<b>Dimensions (WxDxH)</b>	49 x 54 x 53 cm 19.3" x 21.3" x 20.9"
<b>Weight</b>	50 kg/110 lbs
<b>Certifications</b>	EN 61010-1:2001 Low Voltage Directive EN 61326 -1 EMC Directive UL 61010-1:2004 CAN/CSA C22.2 No 61010-1-04 FCC part 15

With the patented technology in the V-10, users can rapidly remove high-boiling solvents like water, DMSO or even NMP at mild temperatures. This ensures rapid evaporation without overheating delicate samples.

Since compounds are dried directly in a vial of choice, tedious tasks such as sample transfers, handling and reformatting are minimized, increasing productivity in the lab.

The Bump-free vortex evaporation prevents sample loss while the system's precise temperature control eliminates sample overheating. All this to maximize sample recovery and fast turnarounds with the V-10's automatic end-of-run detection.

## Evaporation Rates (8 mL solvent)

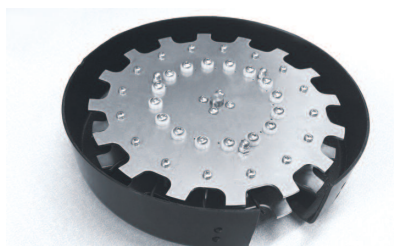
Solvent	BP (°C)	V-10 evaporation (min)	Centrifugal evaporation (min)	Blowdown evaporation (min)
NMP	202	18	N/A	N/A
DMSO	180	15	180	N/A
DMF	150	4	90	N/A
Pyridine	115	5.5	70	N/A
Water	100	9	140	240
Methanol	65	3	70	40
Cyclohexane	81	2.5	40	20

# Accessories



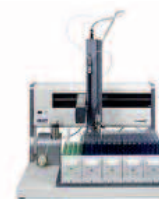
## Vial adapters for V-10

Several vial adapters are available for 4 mL, 8 mL, and other vial types including 4 mL straight side vials.



## Vial carousels for V-10

For automated drying of several solutions, vial carousels are available for 4 mL vials and 20 mL scintillation vials.



## Gilson® liquid handler for V-10

The Gilson GX-271 liquid handler enables fully automated evaporation together with V-10. Evaporate chromatography fractions directly from the chromatography system rack without manual intervention.



## External high-vacuum pumps for V-10

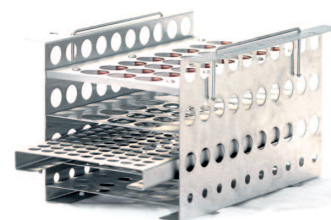
For the enhanced evaporation of high boiling solvents (DMSO, NMP), an external high-vacuum pump is necessary. Biotage offers two models, the oil-based Vacuubrand RZ 2.5 and the oil-free Edwards XDS5.



## TurboVap II ASE conversion kit

With the Dionex ASE and the ASE Compatible TurboVap II a six position rack will accommodate the use of 40mL stemmed tube with 1mL endpoint.

*This tube is available through Dionex Corporation. For further information please contact Dionex at 1-800-523-4571.*



## TurboVap LV ASE conversion kit

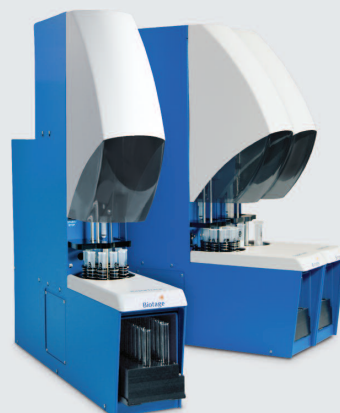
Convert TurboVap LV to 24 sample positions suitable for ASE I-Chem vials. The kit comes with a rack with a removable shelf that allows the user to convert the rack from 40 mL to 60 mL vials and vice versa.

This rack can also be used for the graduated, stemmed 40 mL Dionex vials.

## Related Products

### RapidTrace®+

The RapidTrace+ is a robust automated platform for sample preparation designated for solid phase extraction, SPE. It is used in pharmaceutical, clinical and forensic laboratories to develop and process rugged and reliable methods. The RapidTrace+ eliminates SPE bottlenecks so you can realize the full benefits of today's powerful analytical instruments.



### Biotage® PRESSURE+ 48 & 96

Biotage PRESSURE+ manifolds deliver parallel positive pressure processing for 96 well plates in 1 mL 3 mL and 6 mL column formats. The systems utilize a consistent, uniform flow of positive pressure to move both low and high viscosity liquids through SPE plates and columns. Each port of the Biotage PRESSURE+ manifold independently maintains constant pressure, increasing the overall reproducibility of analyte recoveries. This unique design allows for partially populated racks to be used without sacrificing extraction efficiency.



### Isolera™ Spektra One/Four/LS

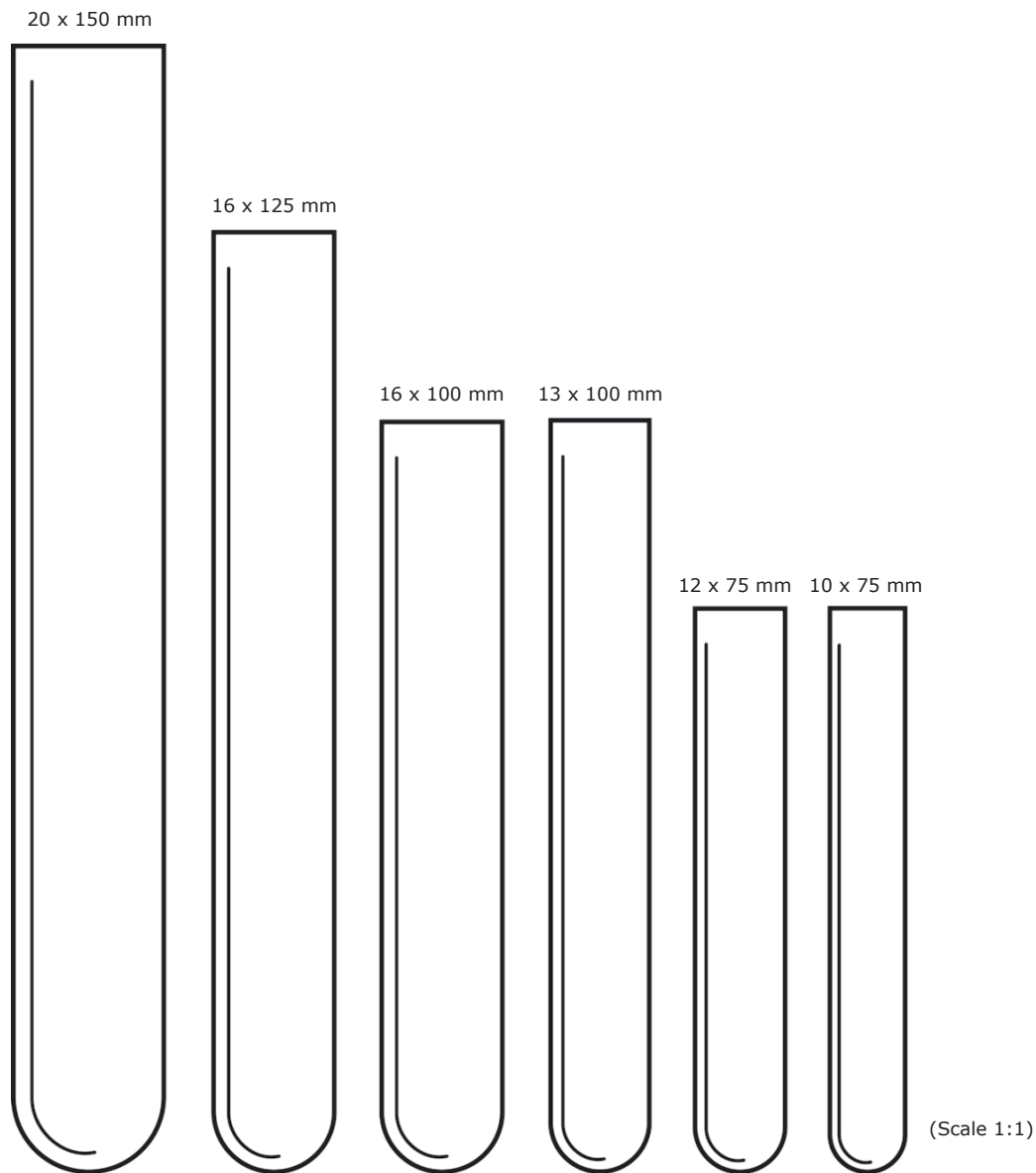
The Biotage Isolera is a family of flash purification systems with intelligent features that enable chemists to easily achieve better separations at scales from milligrams to over 150 g. The new Isolera Spektra enable chemists to purify more compounds in less time and reduce post-process purity analysis. Isolera Spektra doubles chemists' productivity while slashing purification costs with 20% or more.



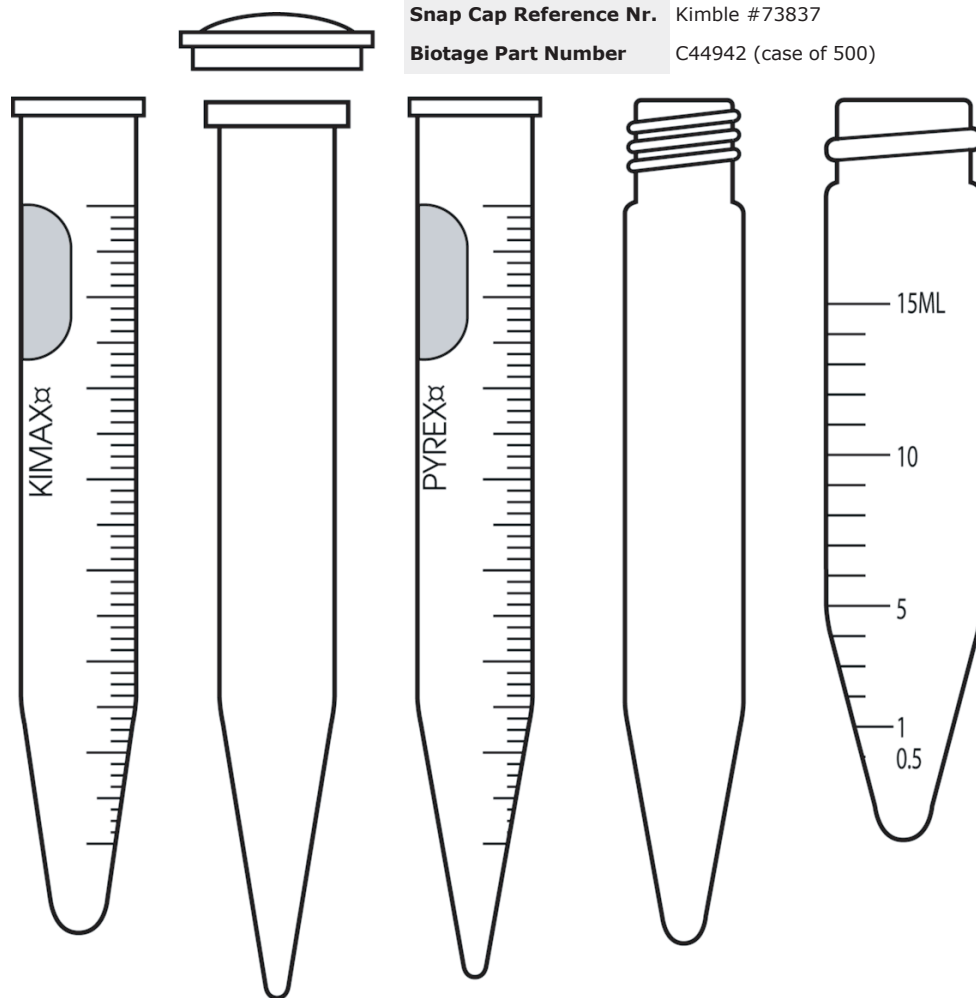
For more information, please visit [www.biotage.com](http://www.biotage.com).

# TurboVap® LV - Tubes and Racks Chart

Match your tube to the outline and order the corresponding rack or tubes



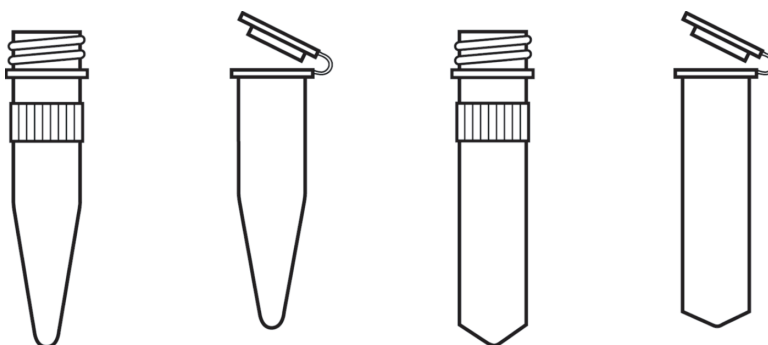
<b>Maximum Recommended Volume</b>	30 mL	16 mL	12 mL	7 mL	4 mL	4 mL
<b>LV Rack Part Number</b>	C44282	C45269	C44139	C45286	C44577	C48950
<b>Test Tube Part Number</b> (amount of tubes included with rack)	C40709 (250)	C45273 (250)	C40708 (250)	C40707 (250)	C44651 (250)	C48985 (250)



**Snap Cap Reference Nr.** Kimble #73837  
**Biotage Part Number** C44942 (case of 500)

<b>Tube Reference Number</b>	Kimble #45165	Kimble #73790	Corning #8080	Kimble #73785	Biotage #47816
<b>Max Recommended Vol.</b>	15 mL	15 mL	15 mL	10 mL	15 mL
<b>LV Rack Part Number</b>	C44880*	C44880*	C44880*	C47820	C47818**
<b>Test Tube Part Number</b>	N/A	C44941	N/A	C47811	C47816

\*Tubes (#C44941, 125 pieces) are included with purchase of this rack.  
 \*\*Tubes not included with purchase of this rack.



<b>Cap Type</b>	Screw Cap	Flip Cap	Screw Cap	Flip Cap
<b>Max Recommended Vol.</b>	1.5 mL	1.5 mL	2 mL	2 mL
<b>LV Rack Part Number</b>	C48929	C48928	C48929	C48928
<b>Test Tube Part Number</b>	N/A	N/A	N/A	N/A

## Ordering Information

### TurboVap® II

Product	Part Number
<b>110V AC</b>	
TurboVap II Concentration Workstation with 200 mL tubes and 1.0 mL stems (110/120V) Includes: set of glassware (6 ea.), auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103187
TurboVap II Concentration Workstation with 200 mL tubes and 0.5 mL stems (110/120V) Includes: set of glassware (6 ea.), auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103186
TurboVap II Concentration Workstation with 50 mL tubes and 0.5 mL stems (110/120V) Includes: set of glassware (12 ea.), auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103188
TurboVap II Concentration Workstation with 50 mL tubes and 1.0 mL stems (110/120V) Includes: set of glassware (12 ea.), auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103189
<b>220V AC</b>	
TurboVap II Concentration Workstation with 200 mL tubes and 0.5 mL stems (220V) Includes: set of glassware (6 ea.), auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103190
TurboVap II Concentration Workstation with 200 mL tubes and 1.0 mL stems (220V) Includes: set of glassware (6 ea.), auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103192
TurboVap II Concentration Workstation with 50 mL tubes and 0.5 mL stems (220V) Includes: set of glassware (12 ea.), auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103193
TurboVap II Concentration Workstation with 50 mL tubes and 1.0 mL stems (220V) Includes: set of glassware (12 ea.), auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103194
<b>ASE versions</b>	
ASE compatible TurboVap II Concentration Workstation to accommodate 40 mL/1.0 mL Dionex tubes (110/120V) Includes: auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103196
ASE compatible TurboVap II Concentration Workstation to accommodate 40 mL/1.0 mL Dionex tubes (220V) Includes: auxiliary rack for holding tubes, 12.5' of 2" diameter duct hose, clear bath and operator's manual	C103197
TurboVap II ASE Upgrade Kit	C64676
<b>Vials</b>	
Evaporation tube (200 mL, 1 mL endpoint, 12/case)	C128506
Evaporation tube (200 mL, 0.5 mL endpoint, 12/case)	C128507
Evaporation tube (50 mL, 1 mL endpoint, 12/case)	C128511
Evaporation tube (50 mL, 0.5 mL endpoint, 12/case)	C128508
Evaporation tube (50 mL, centrifuge, 12/case)	C128512

### TurboVap® 500

Product	Part Number
TurboVap 500, 100/120V, 50/60Hz	C103202
TurboVap 500, 200/220V, 50/60Hz	C103203
<b>Vials</b>	
Evaporation tube (500 mL, 1 mL endpoint, 2/pk)	C128515
Evaporation tube (500 mL, 0.5 mL endpoint, 2/pk)	C128510
Evaporation tube (500 mL, flat bottom, 2/pk)	C128514
<b>Spare parts</b>	
TurboVap 500 condenser (1/pk)	C128509

### TurboVap® LV

Product	Part Number
TurboVap LV, 110V (rack not included)	C103198
TurboVap LV, 220V (rack not included)	C103199
ASE compatible TurboVap LV, 40/60 mL vial, 110V	C103200
ASE compatible TurboVap LV, 40/60 mL vial, 220V	C103201
TurboVap LV ASE Upgrade Kit	C60911
<b>Vials</b>	
Test Tubes (10 x 75 mm, uncapped, 1000/case)	C48985
Test Tubes (12 x 75 mm, uncapped, 1000/case)	C44651
Test Tubes (13 x 100 mm, uncapped, 1000/case)	C40707
Test Tubes (16 x 100 mm, uncapped, 1000/case)	C40708
Test Tubes (16 x 125 mm, uncapped, 1000/case)	C45273
Test Tubes (20 x 150 mm, uncapped, 500/case)	C40709
Test Tubes (10 mL conical, capped, 125/case)	C47811
Test Tubes (15 mL conical, capped, 125/case)	C44941
Test Tubes (polypropylene snap caps for 15 mL conical bottom tubes, 500/case)	C44942
<b>Racks</b>	
Tube Rack (1.5–2.0 mL flip cap microcentrifuge)	C48928
Tube Rack (1.5–2.0 mL screw cap microcentrifuge)	C48929
Tube Rack (10 x 75 mm)	C48950
Tube Rack (12 x 75 mm)	C44577
Tube Rack (13 x 100 mm)	C45286
Tube Rack (16 x 100 mm)	C44139
Tube Rack (16 x 100 mm, prelude compatible)	C44283
Tube Rack (16 x 125 mm)	C45269
Tube Rack (20 x 150 mm)	C44282
Tube Rack (10 mL conical)	C47820
Tube Rack (15 mL conical)	C44880
Tube Rack (15 mL volumetric autotrace)	C47818

### TurboVap® 96

Product	Part Number
TurboVap 96, 100/120V, 50/60 Hz	C103263
TurboVap 96, 220/240V, 60/60 Hz	C103264

## Biotage® SPE Dry 96

Product	Part Number
<b>Single plate</b>	
SPE Dry-96 Dual Heat Source (DHS), NA 110V	SD-9600-DHS-NA
SPE Dry-96 Dual Heat Source (DHS), EU 220V	SD-9600-DHS-EU
<b>Dual plates</b>	
SPE Dry-2x96 Dual Heat Source (DHS), NA 110V	SD2-9600-DHS-NA
SPE Dry-2x96 Dual Heat Source (DHS), EU 220V	SD2-9600-DHS-EU
Additional configurations are available. Please contact a Biotage representative for more information.	
<b>Accessories single plate</b>	
Spare upper needle head assembly with 96 straight needles, PTFE coated	SD-9601-T
Spare upper needle head assembly with 384 straight needles, coated	SD-9601-384-T
Top needle assembly (PTFE coated) - 24 channel	SD-9601-T-24
<b>Accessories dual plate</b>	
Spare upper needle head assembly, 2 x 96 straight needles, coated	SD2-9601-T
Spare upper needle head assembly, 2 x 384 straight needles, coated	SD2-9601-384-T

## Biotage® V-10 Evaporator

Product	Part Number
<b>110V AC (USA)</b>	
with syringe pump	EV10-1SX
with peristaltic pump	EV10-1PX
with dual pumps	EV10-1DX
with syringe pump and carousel drive unit	EV10-1SC
with peristaltic pump and carousel drive unit	EV10-1PC
with dual pumps and carousel drive unit	EV10-1DC
<b>230V AC (EU)</b>	
with syringe pump	EV10-2SX
with peristaltic pump	EV10-2PX
with dual pumps	EV10-2DX
with syringe pump and carousel drive unit	EV10-2SC
with peristaltic pump and carousel drive unit	EV10-2PC
with dual pumps and carousel drive unit	EV10-2DC
<b>100V AC (JPN)</b>	
with syringe pump	EV10-3SX
with peristaltic pump	EV10-3PX
with dual pumps	EV10-3DX
with syringe pump and carousel drive unit	EV10-3SC
with peristaltic pump and carousel drive unit	EV10-3PC
with dual pumps and carousel drive unit	EV10-3DC
<b>Accessories</b>	
4 mL vial upper adapter kit 5 pcs (type A), 8.5 mm neck inner diameter	410647
4 mL vial upper adapter kit 5 pcs (type B), 11.1 mm neck inner diameter	410648
4 mL vial upper adapter kit 5 pcs (type C), 12.0 mm neck inner diameter	410649
4 mL vial lower adapter kit 2 pcs (type A), 14.8 mm vial diameter	411031
4 mL vial lower adapter kit 2 pcs (type B), 14.1 mm vial diameter	411032
4 mL vial lower adapter kit 2 pcs (type C), 16.3 mm vial diameter	411033
Start up kit – Gilson® GX 271 (also 215,222)	411037
V-10 carousel vial holder, 20 mL	411181
V-10 carousel vial holder, 4 mL 14.5 mm (type A/B)	411182
V-10 carousel vial holder, 4 mL 16.5 mm (type C)	411183
Gilson® GX 271 liquid handler for V-10	411816

## Tools for Discovery and Development Chemistry

### Discovery Chemistry

- Microwave Synthesis
- Work-Up and Sample Preparation
- Evaporation
- Flash Purification
- Polymer Supported Reagents

### Process Chemistry

- Silica and Polymer Metal Scavengers
- Genotoxin Removal
- Catalyst Screening
- Purification Scale-Up

### Peptide Synthesis and Purification

- Automated, semi-automated and manual synthesizers
  - Microwave peptide synthesis
  - Room temperature peptide synthesis
  - Solution phase peptide synthesis
- Resins for solid phase peptide synthesis
- HPLC columns

### Analytical Chemistry / Sample Preparation

- Automated SPE Systems
- Evaporation Instrumentation
- Molecularly Imprinted Polymers
- Silica and Resin Based SPE Columns and Plates
- Processing Tools for SPE Columns and Plates
- Supported Liquid extraction columns and plates

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