Solvent Evaporation

Fast, Reliable and Affordable

Biotage®

Fast, Automated and Safe Drying of Solvents

The Widest Range of Evaporation Solutions Available

CONTENTS

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 our 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. TurboVap® II and TurboVap® 500 offer a complete solution for both concentrations into smaller volumes or complete evaporation prior to analysis.

Biotage Evaporation System Selection Guide

	Sample Capacity	Sample Volume	Key Applications	Typical Solvents	Heating	Technology
TurboVap® II 	6	50 mL or 200 mL	Food, water, soil and environmental solvent extraction.	• Acetone • Acetonitrile • Methanol • Dichloromethane • Toluene	Water bath (RT to 90 °C)	Gas vortex shearing technology sensor endpoint detection with either 0.5 mL or 1.0 mL endpoint stems.
TurboVap® II ASE version 	6	40 mL	Food, water, soil and environmental solvent extraction.	• Acetone • Acetonitrile • Methanol • Dichloromethane • Toluene	Water bath (RT to 90 °C)	Gas vortex shearing technology sensor endpoint detection with either 0.5 mL or 1.0 mL endpoint stems.
TurboVap® LV 	50	From 1.5 mL to 30 mL	Forensic, clinical chemistry, food, and pharmaceutical laboratories for concentration of solvents following SPE cleanup of drug sampels or pesticide extracts.	• Acetonitrile • Ethylacetate • Hexane • Methanol • Dichloromethane	Water bath (RT to 90 °C)	Gas vortex shearing technology.
TurboVap® LV ASE version 	24	40 mL or 60 mL ASE tubes	Food, water, soil and environmental solvent extraction.	• Acetonitrile • Ethylacetate • Hexane • Methanol • Dichloromethane	Water bath (RT to 90 °C)	Gas vortex shearing technology.
TurboVap® 500 	2	500 mL	Larger samples, water testing in remote locations with simple lab equipment. Comes with solvent recovery functionality as default.	• Acetone • Hexane • Methanol • Dichloromethane	Water bath (RT to 95 °C)	Gas vortex shearing technology sensor endpoint detection with either 0.5 mL or 1.0 mL endpoint stems.
TurboVap® 96 	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.	• Acetonitrile • DMSO (Dimethyl sulfoxide) • Ethanol • DMF (Dimethyl formamide) • THF (Tetrahydrofuran)	Heat block	Gas vortex shearing technology.
Biotage® SPE Dry 	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.	• Acetonitrile • DMF • Methanol • Propan-2-ol • DMSO	Gas (RT to 80 °C)	Heated gas delivery above and below wells speeds evaporation.
Biotage® V-10 	1	Up to 12 mL (depending on vial)	High BP solvents, reversed phase HPLC fractions.	Almost all solvents, especially good for: • DMF • DMSO • MeCN + water • MeOH + water • NMP	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.

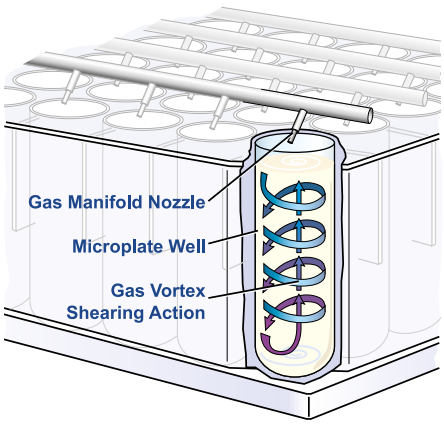


Figure 1. Principle of the gas vortex shearing technology. The position of the gas nozzle close to the tube wall is important for optimized evaporation.

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.

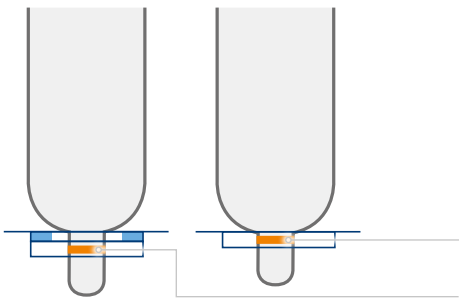


Figure 2. The selection between 0.5 mL and 1 mL end-point detection is easily done with a quick modification of spacers.

Fast, Consistent and Even Results

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.

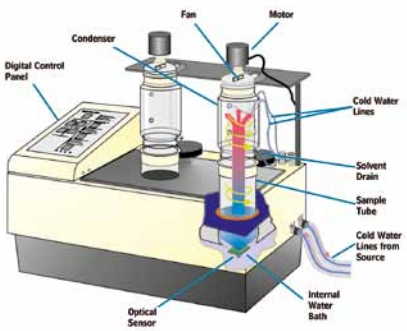


Figure 3. The helical flow establishes a vortex action that promotes sample homogeneity and continuous rinsing of the tube wall.

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

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.

*Dionex ASE is a registered trademark of Dionex/Thermo Fischer.

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

Specifications

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

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

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

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.

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.

*Dionex ASE is a registered trademark of Dionex/Thermo Fischer.

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
	70	12	15
Dichloromethane	35	12	20
MeCN/water	70	12	65
Ethylacetate	35	12	35
	50	12	15
	60	12	10
	70	12	7
Methanol/water	70	12	65
Methanol	35	12	50
	50	12	26
	60	12	18
Water	50	12	210
	60	12	140
	70	12	100

Specifications

Technology	Gas vortex technology
Number of samples	50
Gas control	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.
Timer range	1 to 99 minutes, 0.1 to 9.9 hours, or infinite
Max. sample volume	30 mL (60 mL with ASE version)
Final endpoint volumes	–
Solvent reclamation	–
Water bath temperature	Ambient to 90 °C. Temperatures below ambient can be regulated using the cooling effect of the evaporation process.
Gas supply requirements	Minimum inlet pressure 60 psi/4.1 bar Maximum inlet pressure 100 psi/6.9 bar
Gas consumption	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
Exhaust	5.1 cm/2” venting exhaust (tube supplied)
Electrical supply	220–240 V~, 50 Hz, 5 A (UK & EU) 100–120 V~, 50/60 Hz, 10 A (USA & JP)
Max. power consumed	900 VA
Dimensions (WxDxH)	53.8 cm x 30.2 cm x 30.2 cm 21.2” x 11.9” x 11.9”
Weight	18.4 kg/40.5 lbs
Certifications	2006/95/EC Low Voltage Directive 2004/108/EC EMC Directive 93/68/EEC CE Marking Directive

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_2 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

TurboVap® 500

Volume Range up to 500 mL

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

Technology	Gas vortex shearing technology
Number of samples	2
Timer range	1 to 99 minutes
Max. sample volume	500 mL
Evaporation rate	Adjustable based on water bath temperature, fan speed and chiller or tap water temperature
Final endpoint volumes	Selectable. Automatic endpoints of 0.5 mL and 1.0 mL or dryness.
Solvent reclamation	95% of solvent vapors under typical conditions
Water bath temperature	Ambient to 95 °C (upper temperature with sensors is 60 °C)
Gas supply requirements	Internal fan, 4000–8000 rpm No external gas required
Exhaust	–
Minimum operating pressure	No gas required
Electrical supply	220–240 V~, 50 Hz, 5 A (UK & EU) 100–120 V~, 50/60 Hz, 10 A (USA & JP)
Max. power consumed	900 VA
Dimensions (WxDxH)	61 cm x 30.2 cm x 53.8 cm 24” x 11.9” x 21.2”
Weight	18.4 kg/40.5 lbs
Certifications	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
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

Unique nozzle design ensures fast and efficient vortex shearing evaporation.

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

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-tosample consistency.

Applications

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. 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

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

Evaporation Rates[1]

Solvent	Solvent volume (uL)	Heater temp. (°C)[2]	Gas flow rate (cubic ft/hr.)	Time to evap. to dryness[3]
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	10–15 min.
DMF (Dimethylformamide)	1000	80	70	50 min.
DMSO (Dimethyl sulfoxide)	250	70	60	3 hrs.

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

2. Not the temperature of the solvent in the well.

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

Biotage® SPE Dry

Deep or Shallow 24-, 48-, 96-, and 384-well Plates

Biotage® SPE Dry 96 and SPE Dry 96 Dual Sample Concentrators are suitable for evaporation of micro-plate 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 reproducable 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

Technology	Heated gas delivery above and below wells speeds evaporation
Number of samples	Models for one or two 96 well plates
Format	8 x 12 well microplates and deep-well plates
Timer	Manual
Max. sample volume	10 mL collection plates
Final endpoint volumes	–
Capacity	24, 48, 96 or 384 well plates
Water bath temperature	60 °C (upper head) 80 °C (lower head)
Gas supply requirements	1 bar to 4.1 bar (15 psi to 60 psi)
Gas flow	Operating flow rate 25 L to 100 L per minute (LPM)
Exhaust	–
Electrical supply	220–240 V~, 50 Hz, 5 A (UK & EU) 100–120 V~, 50/60 Hz, 5 A (USA & JP)
Max. power consumed	405 VA
Dimensions (WxDxH)	25.4 cm x 38.1 cm x 40 cm (dual) 10” x 15” x 15.7” 24.2 cm x 30.6 cm x 40 cm (single) 9.5” x 12” x 15.7”
Weight	13.9 kg/31 lbs
Certifications	EN61326 (1997 w/A1: 98 & A2: 01) Class A

Evaporation Rates[1] (minutes)

Solvent	40 °C[2]		60 °C[2]	
	500 µL[3]	1 mL[4]	500 µL[3]	1 mL[4]
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
Acetonitrile	17	20	12	15.5
Methanol/(v/v) 1% NH4OH	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% NH4OH	8.5	11.5	6	8

1. 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 affect results.

2. Temperatures refer to the upper head. Bottom unit was 20 °C higher.

3. 500 µL volumes were in a 1 mL collection plate.

4. 1 mL volumes were in a 2 mL collection plate.

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 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.

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.

With the patented technology in 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 automatic end-of-run detection.

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 re-dissolve
- Evaporation of high boiling point solvents

Specifications

Technology	Patented, 3-way evaporation including simultaneous heating, vacuum, and high speed vial rotation
Number of samples	1–16 (with carousel)
Sample delivery	5 mL syringe pump and/or peristaltic pump
Max. sample volume	30 mL (single vial)
Vial size compatibility	4 mL (3 variants) 8 mL HPLC vial 16 ml vial 20 mL scintillation vial 30 mL scintillation vial
Final endpoint volumes	User selectable volumes
Solvent reclamation	Up to 98% of solvent vapors under typical conditions
Gas supply requirements	Nitrogen (when using pump for solvent delivery)
Exhaust	Double trapping
Vacuum operating range	Ambient to 2 mbar
Electrical supply	220–240 V~, 50 Hz, 8 A (UK & EU) 100–120 V~, 50/60 Hz, 15 A (USA & JP)
Max. power consumed	1700 VA
Dimensions (WxDxH)	49 cm x 54 cm x 53 cm 19.3" x 21.3" x 20.9"
Weight	50 kg/110 lbs
Certifications	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

Evaporation Rates (8 mL solvent)

Solvent	Boiling Point (°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
Cydohexane	81	2.5	40	20

Accessories

Vial Adapters for Biotage® 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 Biotage® 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 Biotage® 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.

High-vacuum Pumps for Biotage® 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 40 mL stemmed tube with 1 mL endpoint. This tube is available through Dionex Corporation. For further information please contact Dionex at 1-800-523-4571.

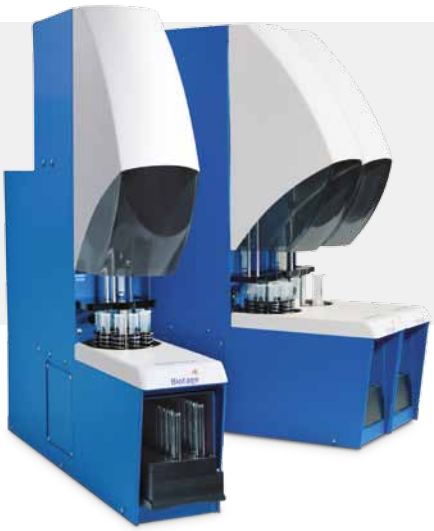
TurboVap® LV ASE Conversion Kit

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®+

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. RapidTrace+ eliminates SPE bottlenecks so you can realize the full benefits of today's powerful analytical instruments.



Biotage® PRESSURE+ 48 & 96

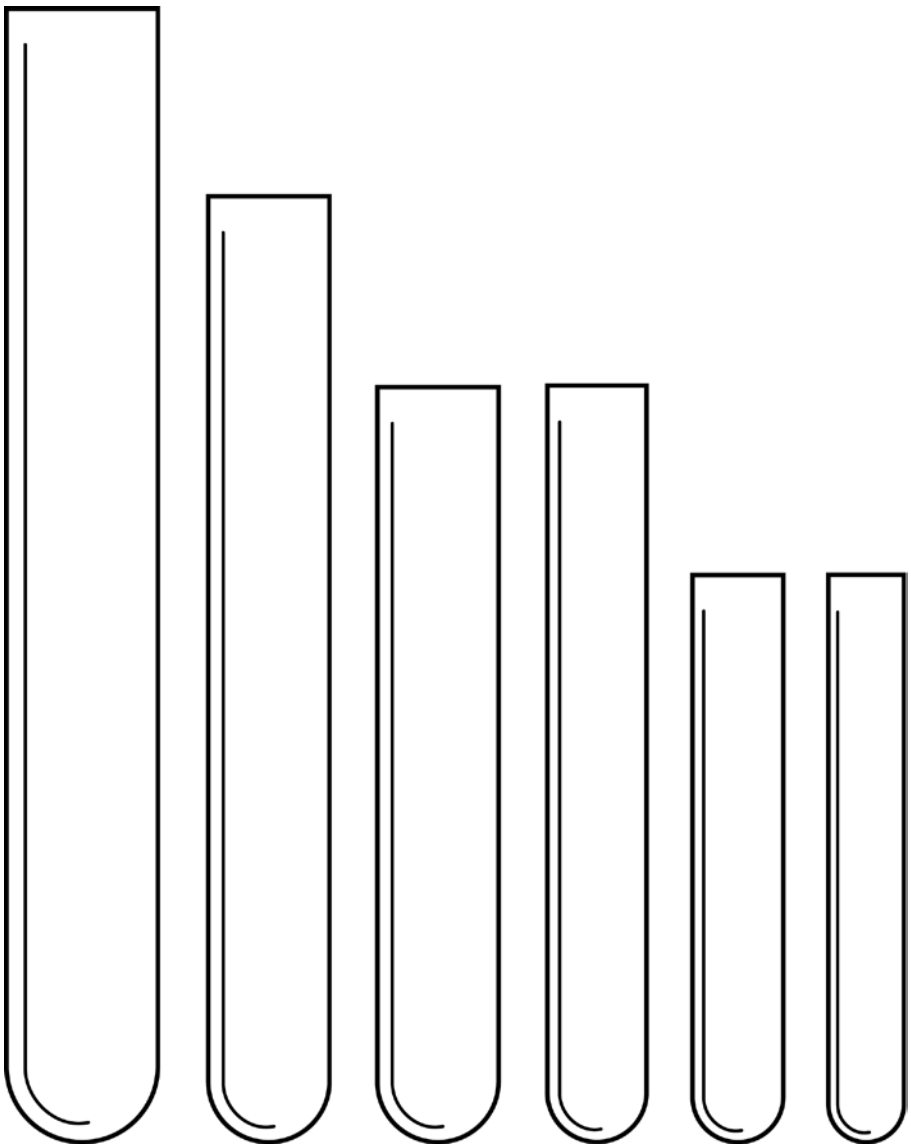
PRESSURE+ manifolds deliver parallel positive pressure processing for 96 well plates in 1 mL 3 mL and 6 mL column formats. The systems utilize a consistent, uniform flow of positive pressure to move both low and high viscosity liquids through SPE plates and columns. Each port of the PRESSURE+ manifold 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

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 enables 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.

TurboVap® LV – Tubes and Racks Chart

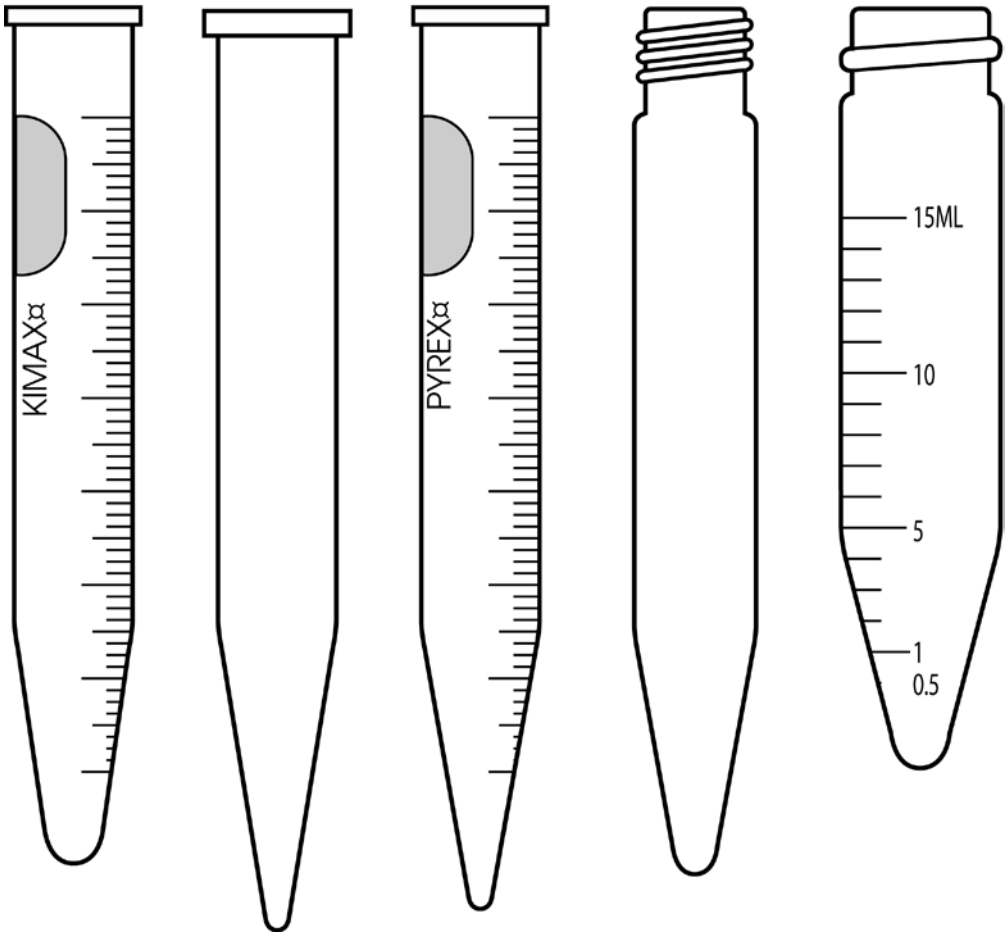
Match Your Tube to the Outline and Order the Corresponding Rack or Tubes



(Scale 1:1)

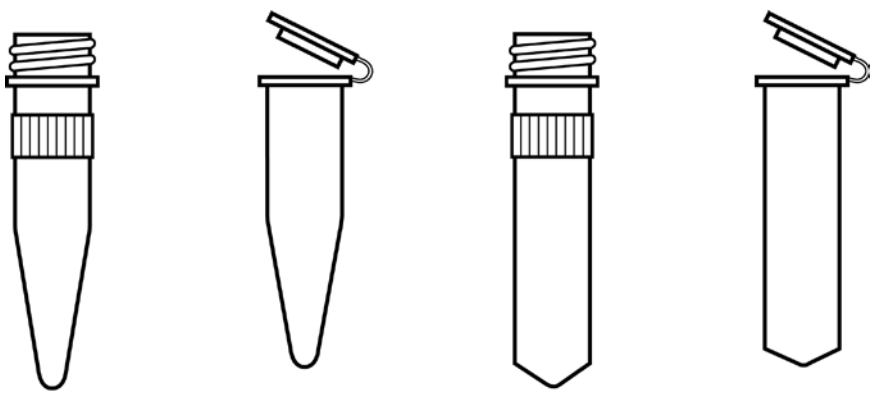
Dimensions (mm)	20 x 150	16 x 125	16 x 100	13 x 100	12 x 75	10 x 75
Maximum recommended volume	30 mL	16 mL	12 mL	7 mL	4 mL	4 mL
LV rack part number	C44282	C45269	C44139	C45286	C44577	C48950
Test tube part number	C40709	C45273	C40708	C40707	C44651	C48985
Packsize	250	250	250	250	250	250

Snap cap reference nr Kimble #73837
Biotage part number C44942 (case of 500)



Tube reference number	Kimble #45165	Kimble #73790	Corning #8080	Kimble #73785	Biotage #47816
Max recommended volume	15 mL	15 mL	15 mL	10 mL	15 mL
LV rack part number	C44880*	C44880*	C44880*	C47820	C47818**
Test tube part number	N/A	C44941 (vials only)	N/A	C47811	C47816

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



Cap type	Screw Cap	Flip Cap	Screw Cap	Flip Cap
Max recommended Vol.	1.5 mL	1.5 mL	2 mL	2 mL
LV rack part number	C48929	C48928	C48929	C48928
Test tube part number	N/A	N/A	N/A	N/A

Ordering Information

TurboVap® II

Product	Part Number
110V AC	
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
220V AC	
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
ASE Versions	
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

Product	Part Number
Vials	
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
Vials	
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
Spare Parts	
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
TurboVap LV-PTFE, bath, manifold, 50 pos, vial 120V	C112175
TurboVap LV-PTFE, bath, manifold, 50 pos, vial 220V	C133718
Vials	
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

Product	Part Number
Racks	
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
Tube Rack (ASE i-Chem Vials), TurboVap LV	C61345

TurboVap® 96

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

Biotage® V-10 Evaporator

Product	Part Number
110V AC (USA)	
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
230V AC (EU)	
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
100V AC (JPN)	
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

Product	Part Number
Accessories	
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

Biotage® SPE Dry 96

Product	Part Number
Single Plate	
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
Dual Plates	
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.	
Accessories Single Plate	
Spare upper needle head assembly with 96 straight needles, PTFE coated	SD-9601-T
Spare upper needle head assembly with 384 straight needles, PTFE coated	SD-9601-384-T
Top needle assembly (PTFE coated) - 24 channel	SD-9601-T-24
Accessories Dual Plate	
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

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