Biotage® VacMaster™ 10 & 20 Sample Processing Station

Operation Manual

Biotage®

CONTENTS

Important Information

In the interest of safety, the Biotage® VacMaster™ is thoroughly tested at high vacuum. This involves a series of cycles from low vacuum to nominal full vacuum followed by a final 'hold' phase at normal full vacuum. As such, we have the utmost confidence in the quality of this product.

However, as with all glass vessels under vacuum, there is a risk of implosion particularly if the unit is subject to any sharp knocks or scratches. With this in mind, please follow the safe working practices detailed below.

Safe Working Practices

1. Do not use the VacMaster at a vacuum greater than minus 20" Hg (-0.68 bar).
2. Always wear eye protection when using the VacMaster under vacuum. As with all glass laboratory equipment operated under vacuum, we consider it prudent to operate the unit behind a suitable safety screen.
3. Avoid knocking or scratching the VacMaster with any sharp or heavy object.
4. If the VacMaster glass tank is dropped, scratched or damaged in any way, we strongly recommend that it should be replaced.

While we make every effort to ensure the quality of the VacMaster, misuse or damage incurred in use can seriously compromise the structural integrity of the product. Consequently, IST Ltd can accept no liability for injury or damage caused by the VacMaster or its accessories.

Introduction

About the Biotage® VacMaster™

The Biotage® VacMaster™ is a state-of-the-art sample processing station. It incorporates innovative design features that make simultaneously processing multiple samples easier than ever before. For scientists working with biological fluids, these features and operating procedures provide a safe system. The VacMaster has 10 or 20 ports with disposable stainless steel needles that accept any male luer sample preparation product. A PTFE needle or combined needle stopcock are available for inert sample delivery. The design features, materials of construction and full range of accessories mean that the VacMaster meets the needs of scientists involved in multiple sample processing in solid phase extraction (SPE) or combinatorial chemistry application work.

Included components

- A glass tank fitted with a rotating vacuum outlet valve with a drain tube
- A PTFE lid fitted with 10 or 20 stainless steel needle retainers
- A vacuum gauge and controller with coarse and fine adjustments mounted to the lid
- A complete collection tube rack fitted with 10, 12 or 16 mm plates (plus 27mm for VacMaster-10)
- A package of 10 or 20 stainless steel needles with port sealing plugs

Optional accessories

- Additional rack plates for 10, 12, 16, 27mm (Vac-10) collection tubes or a blank plate for customization
- A spare glass tank with vacuum outlet fitting
- PTFE T-type valve for switching between two tanks
- PTFE stopcocks
- PTFE needles or combination needle stopcocks
- Combined PTFE needle stopcock designed for combinatorial chemistry applications where the stopcock must be used under positive pressure conditions
- VacMaster LVE accessories for the extraction of multiple large volume water samples using both polypropylene and glass ISOLUTE SPE columns
- VacMaster compatible glass and polypropylene columns with associated frits for combinatorial chemistry applications (details contained in the IST catalogue)

Specifications

Materials	
Lid	PTFE
Rack	Ultra high molecular weight polyethylene (UHMW PE), polypropylene (legs)
Waste Outlet	PTFE
Vacuum Gauge	Various
Controller Arm Assembly	Delrin
Tank	Glass
Rack Plates	Ultra high molecular weight polyethylene (UHMW PE)
Needle	316 Stainless Steel
Needle	Retainer PTFE
Vacuum release valve	Brass
Details	
Maximum Applied Vacuum	minus 20" Hg (-0.68 bar)
Sampling Ports	10 on VacMaster-10, 20 on VacMaster-20
Collection Rack	for 10, 12, or 16 mm collection tubes (or 27 mm for VacMaster-10) (specified when ordering) or a blank plate for customisation

Principle of Operation

The Biotage® VacMaster™ applies a vacuum to the outlet of an SPE column to assist in the extraction of aqueous or viscous samples or to simultaneously process multiple samples. The VacMaster uses a vacuum controller with fine and coarse adjustment knobs and a vacuum gauge to set and monitor the vacuum applied to the glass tank. The lid seals to the tank with a gasket assisted by the vacuum. Applying vacuum to the tank and opening the stopcock will draw the sample or eluent through the SPE column or other sample preparation product. The sample or eluent collects in test tubes or vials held in the rack below the delivery tips. Alternatively, using the VacMaster without a rack, the solvent can collect in the bottom of the tank. The glass tank has a vacuum outlet fitting that can be oriented two ways. With the fitting is turned up, solution will remain in the tank below the level of the outlet fitting. When the fitting is swivelled down, waste fluids in the tank flow into a collection trap for proper disposal.

Features

Easy to access stopcocks and room for large volume columns
The VacMaster is available with 10 or 20 places. With generous spacing between positions, you can use every place every time, even with stopcocks and large volume columns. The VacMaster 10 can accommodate up to 10 x 70 ml columns. The VacMaster 20 can accommodate up to 20 x 25 ml columns.

A rack system that is easy to adjust to a variety of collection tubes
The continuously adjustable rack system uses unique threaded rods to secure the rack plates where you need them. Rack plates are available for 10, 12, and 16 mm diameter tubes as standard (and 27 ml for VacMaster-10 only). Conversion from one size tube to another is easy. Just purchase the low cost plates, release the top nut and replace the plates. However, customization is easy with blank plates drilled to the required diameter. The maximum tube diameter possible with the VacMaster-10 is 27 mm (accommodates scintillation vials), and VacMaster 20 is 23 mm (order specially).

Needles with easy to use stopcocks that do not contaminate samples
The one piece needle design with a straight though flowpath will not trap samples or eluents which could contaminate the subsequent sample. The disposable stainless steel needles are 316 stainless and will not corrode like stainless-steel-clad-copper needles. PTFE retainers hold the stainless steel needles in place, so they are easy to remove and replace. The inert construction of the PTFE needle or combination needle stopcock eliminates plasticizer contamination and ensures smooth stopcock operation. Tapered PTFE tips eliminate overspray and direct the sample and eluent into the collection tube. All of the needles are securely threaded into the manifold top so they will not pull out when removing the SPE column. For combinatorial chemistry applications which require a small positive pressure to be applied to the column reservoirs, a special positive pressure compatible combined PTFE needle stopcock is available (see page 17 for ordering information).

Materials of construction that will not contaminate samples
The VacMaster is manufactured from high quality materials that will not contaminate the samples being processed. The materials include glass, PTFE, UHMW polyethylene, polypropylene, and 316 stainless steel. The thick walled glass tank provides a clear view of the extraction process.

Vacuum controllers that will not become contaminated or corrode
The precision made vacuum controller with gauge provides excellent sample flow control. The vacuum regulator, placed on the lid, is easy to see and control. Column eluents will not pass by and contaminate or corrode the regulator.

Safe, easy way to handle biological and hazardous sample matrices
With the lid-mounted vacuum controller, it is possible to use one tank to process the samples and dedicate a second low cost tank for the elution step. Thus, the second tank can remain uncontaminated. Additionally, the vacuum outlet fitting on the glass tank can be oriented two ways. Turn the fitting up to close the outlet and add the appropriate sterilization solution to the tank to neutralize the collected biological solutions. Swivel the fitting down to direct the waste fluids out of the tank into a side arm collection flask for proper disposal.

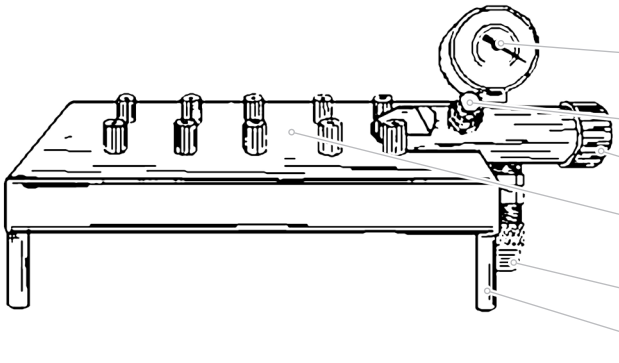

Figure 1. Lid

A. Vacuum gauge (p/n 0018) mounted on controller arm assembly (p/n 121-0025)

B. Fine control valve (p/n 121-0020)

C. Coarse vacuum control valve (Open or Closed)

D. PTFE lid (for replacement lit complete with all fittings, order p/n 121-1045 (VacMaster-10) or 121-2075 (VacMaster-20)

E. Vacuum relief valve (p/n 121-0019)

F. Lid leg (p/n 121-0026)

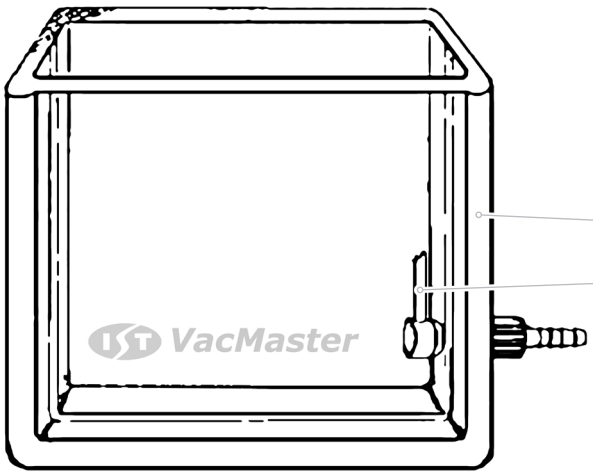

Figure 2. Glass tank. For replacement tank complete with fittings, order part # 121-1039 (VacMaster-10) or 121-2068 (VacMaster-20)

A. Thick walled glass tank

B. For replacement waste outlet fittings, order p/n 121-0029 (VacMaster waste outlet (complete)

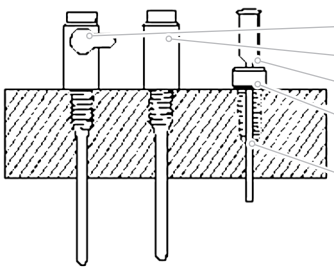

Figure 3. Needles

A. PTFE stopcock needle unit (p/n 121-0001)

B. PTFE needle unit (p/n 121-0002)

C. Stainless steel needle (p/n 121-0003)

D. Stainless steel needle retainer (p/n 121-0004)

E. Threaded needle ports

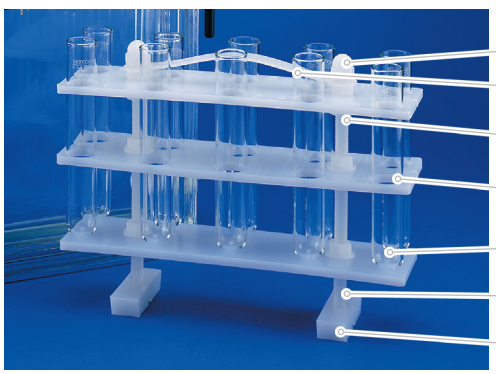

Figure 4. VacMaster collection tube rack

A. Rack dome nut (p/n 121-0040)

B. Rack handle (p/n 121-0043 (VacMaster-10), 121-0044 (VacMaster-20)

C. Rack nut washer (p/n 121-0041)

D. Top / mid plate (various p/n)

E. Lower plate (various p/n)

F. Rack leg (p/n 121-0045)

G. Rack foot (p/n 121-0042)

Installation

Unpacking

The Biotage® VacMaster™ is shipped with all accessories in one box. Before using the VacMaster, unpack all the components carefully. Do not discard any packing material until you have checked the VacMaster and accessories. We suggest that you store the packing materials to have them available for storage or future shipments.

If you find any damage to the unit or the box, contact the shipping company that delivered the VacMaster and file a claim. Please contact IST Ltd via your local distributor for assistance in repairing or replacing the product.

What You Will Need

In addition to the VacMaster and the accessories, you will need the following to use the VacMaster.

Vacuum source

Vacuum control unit with integral vacuum generator (Part number 121-9602)

Converts standard laboratory compressed air supply to vacuum which is ample for processing samples on a VacMaster. The unit has a small footprint, and has low noise emissions compared to a standard vacuum pump. Connect the vacuum source to the vacuum outlet fitting on the side of the glass tank using vacuum tubing. Place a trap in the vacuum line to collect any liquid for proper disposal.

Vacuum pump

We recommend that you use a vacuum pump that is oil free and generates no more than minus 20” Hg (-0.68 bar). Connect the vacuum source to the vacuum outlet fitting on the side of the glass tank using vacuum tubing. Place a trap in the vacuum line to collect any liquid for proper disposal.

Suitable vacuum sources, tubing and a 1L polypropylene trap are available from IST (see pages 17 and 18 for ordering details).

SPE columns
Select columns capable of retaining and eluting the compounds of interest. If you are uncertain as to which column to use, please contact your local IST distributor for technical advice or assistance.

Collection tubes
Select collection tubes suitable for your rack and your intended use. Racks are available to accommodate 10, 12, or 16 mm tubes (and 27mm for Biotage® VacMaster™-10). If using a different collection tube, purchase blank plates and drill them to fit any collection tube.

Installing the Needles

The stainless steel needle retainers are securely threaded into the lid when the VacMaster is assembled, and fitted with stainless steel needles.

PTFE needles or combination needle stopcocks can be used in place of the stainless steel needles. To install these needles, remove the stainless steel needle retainers by rotating them counterclockwise until they are free from the lid. Place the new PTFE needle or combination needle stopcock into position and turn clockwise until firmly seated against the lid. Use caution to thread the needle correctly. Misthreading or overtightening the needles or needle retainers could damage the threads on the needles, retainers, or lid ports.

Installing Collection Tubes

The collection tube rack comes pre-assembled and should be ready to use with most collection tubes. Simply place the collection tube in the rack under each position you intend to use. If your tubes do not fit in the rack or are not securely held by the collection tube rack, you may need to replace the rack plates or adjust the rack.

Replacing Collection Tube Racks

The VacMaster is shipped with tube racks for 10, 12 or 16 mm tubes (or 27mm for VacMaster-10), specified with each order. Compare the part number of your VacMaster with the ordering information in the appendix to determine which rack you have. Alternatively, measure the diameter of the opening in the top collection tube rack plate. Additional 10, 12, or 16 mm (or 27mm for VacMaster-10) collection tube racks or rack plates are available. Blank plates can be drilled to meet other collection tube requirements. Part numbers and ordering information are in the appendix.

To convert collection tube racks:
1. Remove all collection tubes from the rack and remove the rack from the glass tank.
2. Grip top plate securely, and unscrew dome nuts counterclockwise.
3. Lift off carrying handle.
4. Each plate is held in place by nut washers positioned above and below the plate. To remove a plate: unscrew (counterclockwise) nut washers from above the plate, and lift off plate. Unscrew and remove nut washer from below plate
5. Remove the top and middle collection tube rack plates and replace with appropriate plates. Plate height can be changed by adjusting the position of the upper and lower nut washers for each plate. Ensure that the nut flange is adjacent to the plate, and that all nuts are tightened to plates for rigidity.
6. Replace carrying handle.
7. Replace dome nuts. Use caution to thread all nuts correctly. Misthreading could damage the threads.

Adjusting the Collection Tube Rack

If your collection tubes are not securely held by the collection rack, the rack may need adjustment. Each plate is held in place by nut washers positioned above and below the plate. When adjusting the rack, remember to keep all plates level. Refer to Figure 3 while adjusting the rack.

Bottom, middle and top plates
To raise the plate: turn the nut washers above the plate counterclockwise until they reach the correct height. Turn the nut washers below the plate counterclockwise to raise the plate and tighten to secure in position.

To lower the plate: turn the nut washers below the plate clockwise until they reach the correct height. Turn the nut washers above the plate clockwise to lower the plate and tighten to secure in position.

Handle and dome nuts
Securely tighten the dome nuts above the handle at the top of the rack legs at all times, to provide a secure handle for inserting or removing the rack from the tank.

Routine Operation

Using the Vacuum Control and Gauge

1. Place the SPE columns in the needle ports and add solvent or sample to the column reservoirs.
2. Open the stopcocks if they are being used. Open both the coarse and fine vacuum control valves on the Biotage® VacMaster™ lid. The coarse control valve is open when it is turned counter-clockwise. The fine control is open when turned fully counter-clockwise.
3. Apply vacuum to the VacMaster manifold from the vacuum source.
4. Close the coarse vacuum control valve by turning clockwise. Adjust the vacuum by turning the fine control knob clockwise until the desired vacuum level and flow rate is obtained. Monitor the vacuum level on the vacuum gauge next to the control knobs. A vacuum level of minus 3 to minus 5" of Hg is satisfactory for most applications. Establishing the vacuum level needed for optimum flow rates through the SPE column is an important part of every method development procedure.

   Note: Do NOT exceed minus 20" Hg (minus 0.68 bar) at any time. Vacuum levels above minus 20" Hg significantly increase the risk of implosion of the glass tank and serious personal harm.
5. If stopcocks are being used on the needle ports, the flow rate through each SPE column can be individually regulated by the stopcock position.
6. When the desired volume of solvent or sample is drawn through the tube, close each stopcock if they are being used. Next open the fine control knob by turning it counter-clockwise. Open the coarse control valve by turning counter-clockwise. Turn off the vacuum source.
7. Continue the processing by adding the next solution to each SPE column reservoir. Repeat procedure from step 2 above.

Using the Waste Outlet Fitting

The waste outlet fitting inside the glass tank of the VacMaster can be oriented in two positions. When the fitting is positioned so the drain tube is up, liquid collects in the tank. When the fitting is turned down, any liquid that reaches the drain tube will be removed by vacuum from the tank though the outlet fitting. A collection flask in the vacuum line is essential with the outlet fitting in this orientation to collect the evacuated liquid. Without a trap, the liquid would enter the vacuum pump and could damage the pump.

Using the Biotage® VacMaster™ with Biological or Hazardous Materials

When processing physiological fluids, tissues, environmental, or other hazardous samples, it is advantageous to purchase a second low cost tank to dedicate to the analyte elution step. This second tank can remain uncontaminated. A single vacuum source can be used by placing a PTFE T-valve in the vacuum line between the vacuum source and each manifold. The first tank can be used without a collection tube rack to collect the liquids exiting the columns during sample application and interference elution steps. By turning the waste outlet fitting up, liquids will remain in the tank. An appropriate sterilization solution (for example, bleach) can be added to the tank to neutralize the collected biological liquids. Swivel the fitting down to direct the waste fluids out of the tank into a collection flask for proper disposal. Or pour the waste fluids from the tank into the appropriate waste container.

After the samples have been loaded on the SPE columns and the interferences have been eluted, the VacMaster lid can be removed from the first tank and placed on the second tank. Then the samples can be eluted into collection tubes in the clean second tank.

Solid Phase Extraction

Sample preparation prior to instrumental analysis is often as important to an assay as the instrumental analysis itself. This is especially true when very low levels of detection are required for compounds from complex matrixes such as physiological fluids, tissues, food, agricultural products and environmental samples. Solid phase extraction (SPE) is the most powerful technique currently available for rapid, selective sample preparation. The versatility of SPE allows it to be used for a number of purposes, such as:

- Purification
- Trace enrichment
- Solvent exchange - analytes are transferred from one particular matrix environment to another, for example, aqueous to organic
- Desalting
- Derivatization - analytes are retained on a sorbent, derivatized, then eluted
- Class fractionation - a sample is separated into different compound groups that share common properties

SPE offers many benefits and advantages over more traditional sample preparation techniques (such as liquid/liquid extraction), including the following:

1. High recoveries of the analytes
2. Concentration of the analytes
3. Highly purified extracts
4. Ease of automation
5. Compatibility with instrumental analysis
6. Reduction in organic solvent consumption
7. No problems with emulsion formation
8. Simultaneous processing of multiple samples
9. Suitability to small sample sizes

As a result, the use of SPE has grown dramatically over the last ten years, and continues to grow as the preferred technique for state-of-the-art sample preparation.

SPE is a very simple technique to use, employing inexpensive, disposable extraction columns. These columns are available in a multitude of column sizes and sorbents. Please contact your local IST distributor for assistance with column selection.

In principle, SPE is analogous to liquid/liquid extraction. As a liquid sample passes through the SPE column, compounds are 'extracted' from the sample onto the sorbent material in the column. Interferences can then be selectively removed from the column through the correct choice of 'wash' solvents. Finally, an elution solvent recovers the desired analytes from the column, resulting in a highly purified extract. This extract is often significantly more concentrated than the original sample. Alternatively, select an extraction column and elution solvent combination that retains interferences on the sorbent, but allows the analytes to pass through unretained.

ISOLUTE® SPE columns contain sorbents with an average particle size of 50µm. Although gravity can facilitate flow of most organic solvents through the columns, for aqueous and other viscous samples and solvents, a motive force must be used to pass liquids though the columns. The most common method is vacuum applied to the column outlet. The Biotage® VacMaster™ vacuum manifold is specifically designed for this purpose.

Guidelines for the Use of Solid Phase Extraction olumns

Successful use of SPE columns is relies on proper treatment of the columns (and the original sample) through all stages of an extraction. The following section offers general guidelines for each step of an SPE procedure.

Column processing

- Do not force liquids through the SPE column too quickly. This is especially significant when performing ion-exchange extractions, because too fast a flow can cause analyte break-through (analytes pass unretained through the column) or poor column equilibrium. One to two milliliters per minute is a good starting point for 100mg/1ml columns. For larger diameter columns, proportionally higher flow rates can normally be used.
- Ensure the analytes (compounds of interest) are in solution and available for interaction with the sorbent. If the sample contains particulate matter to which the analytes adsorb, it is necessary to first desorb the analytes from the particulate before a successful extraction is possible. Similarly, if the analytes are chemically bound to large molecules in the sample (for example, drug analytes bound to sample proteins), this binding must be disrupted in order to achieve high extraction efficiencies. This may be accomplished in a variety of ways, such as adjusting the pH or through the addition of an organic solvent.
- Filter or otherwise remove sample particulates as necessary. Although SPE columns act as physical filters to a certain degree, it is possible to plug the column frits, thus preventing flow though the columns. Ensure that the analytes are not adsorbed to the particulates being removed from the sample prior to extraction! ISOLUTE® SPE columns (sizes B-F) are now available with an integral depth filter to help handle particulate laden samples. Alternatively large diameter depth

filter reservoirs which can be attached to any SPE columns are available. Details are contained in the IST catalogue.

Steps in solid phase extraction
A typical SPE procedure involves six basic steps:

1. Sample pre-treatment
2. SPE column solvation
3. SPE column equilibration
4. Sample application to the SPE column
5. SPE column washing (interference elution step)
6. Analyte elution from the SPE column

Sample pre-treatment
Proper sample pre-treatment involves preparing the sample both physically and chemically for the solid phase extraction. SPE works effectively only on liquid samples. Such samples may require filtration prior to processing. Solid samples that cannot be dissolved directly are typically homogenized, followed by filtration (ensure the analytes are dissolved in the initial extract to be processed with the SPE column). Alternatively, extract solids with a liquid prior to SPE.

One of the primary goals of sample pre-treatment is to create a sample whose chemistry promotes retention of the analytes on the chosen extraction column. Chemical treatment of a sample may involve:

- sample dilution - to facilitate flow through the SPE column by reduction of sample viscosity or ionic strength, and to enhance analyte retention
- addition of a buffer - to control or change the pH of the sample
- initial liquid/liquid extraction

SPE Column Solvation
In order for the sorbent in an SPE column to retain an analyte, it is necessary for a proper 'phase interface' to exist between the sorbent and the sample. This solvation process is usually the first step of an extraction, and involves passing methanol, acetonitrile, or other organic solvent though the column. This solvent 'wets' the phase, ensuring interaction with the sample matrix. For example, a C18 phase is very hydrophobic, and will not retain analytes from a 100% aqueous sample without first being solvated. A typical volume of solvation solvent is 0.5–1.0ml/100 mg sorbent.

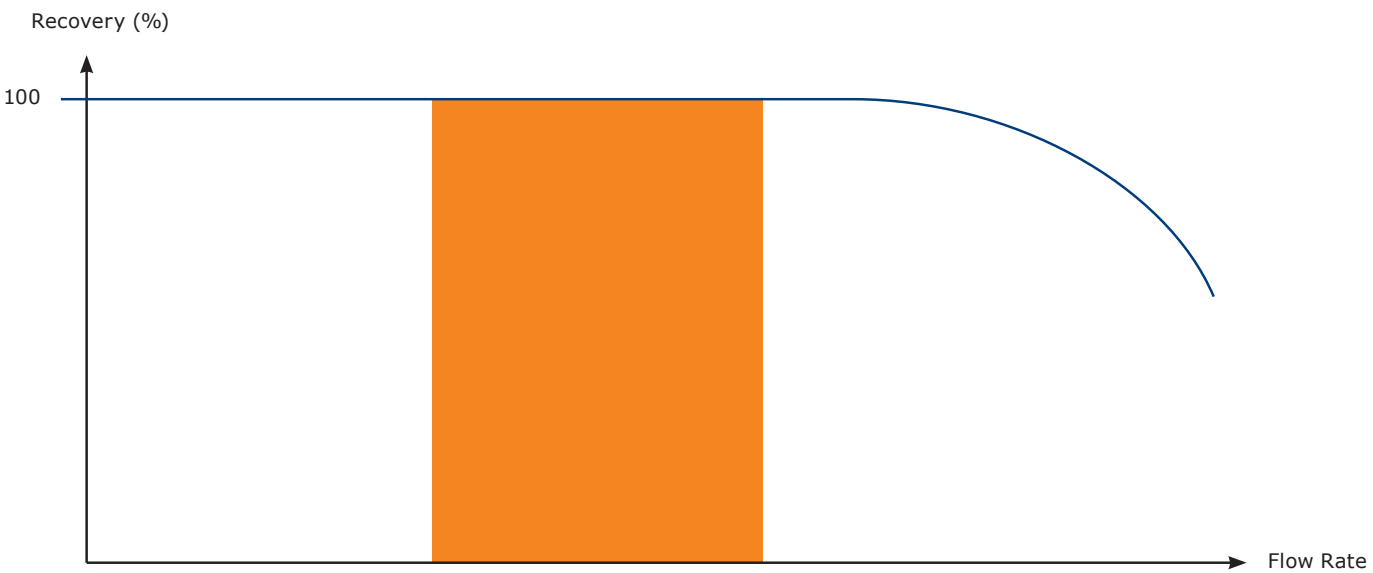

Figure 4. Sample loading flow rate vs. extraction efficiency

SPE Column Equilibration

Following solvation of the column, and prior to applying the sample, it is necessary to equilibrate the column. Equilibrate a column by treating it with a solvent that is as 'sample-like' as possible. For example, if the sample is a buffered physiological fluid, it may be suitable to equilibrate the column with the sample buffer. Conversely, if the sample is an organic solvent extract, then the column should be equilibrated with the same organic solvent. The equilibration step should put the bonded phase in a condition that promotes analyte retention. A typical volume of solvent is 1ml/100 mg sorbent.

Sample application to the SPE column

Apply the sample after solvating and equilibrating the column. Again, it is very important to allow the sample sufficient time to pass through the column (too rapid a flow may cause reduced recoveries). See Figure 4. Establishing optimum flow rates is an important part of the method development procedure.

SPE column washing (interference elution step)

After applying the sample to the column, perform one or more solvent wash steps. The purpose of wash steps is to selectively elute undesired compounds from the sorbent without eluting the analytes of interest. Solvents in which the analytes are insoluble are often very good choices for wash solvents. If the wash solvent is immiscible with the solvent in which the sample was applied, a drying step is necessary. When using non-polar and ion-exchange sorbents, pH control of the interference elution solvent is often necessary for reproducible results. Control the flow rate of the interference elution solvent. If the flow rate is too high, the final extract may not be as clean as possible.

Analyte elution from the SPE column

The final step in SPE is to recover the desired analytes from the extraction column. Do this by washing the column with a solvent that can elute the analytes from the sorbent into a suitable collection vessel. There are often many options for the choice of elution solvent. The final selection may be influenced by the ease of solvent evaporation or compatibility with the final analytical technique. The typical minimum elution volume is 250 µl / 100 mg sorbent. If the sample elution solvent is immiscible with the preceding wash solvent, it is necessary to use a drying step to avoid low recoveries. It is a prudent practice to wipe each needle tip between the interference elution step and the analyte elution to ensure extraction purity.

Flow control in the elution step can be important. Excessive flow rates can result in reduced recoveries of analytes (Figure 5).

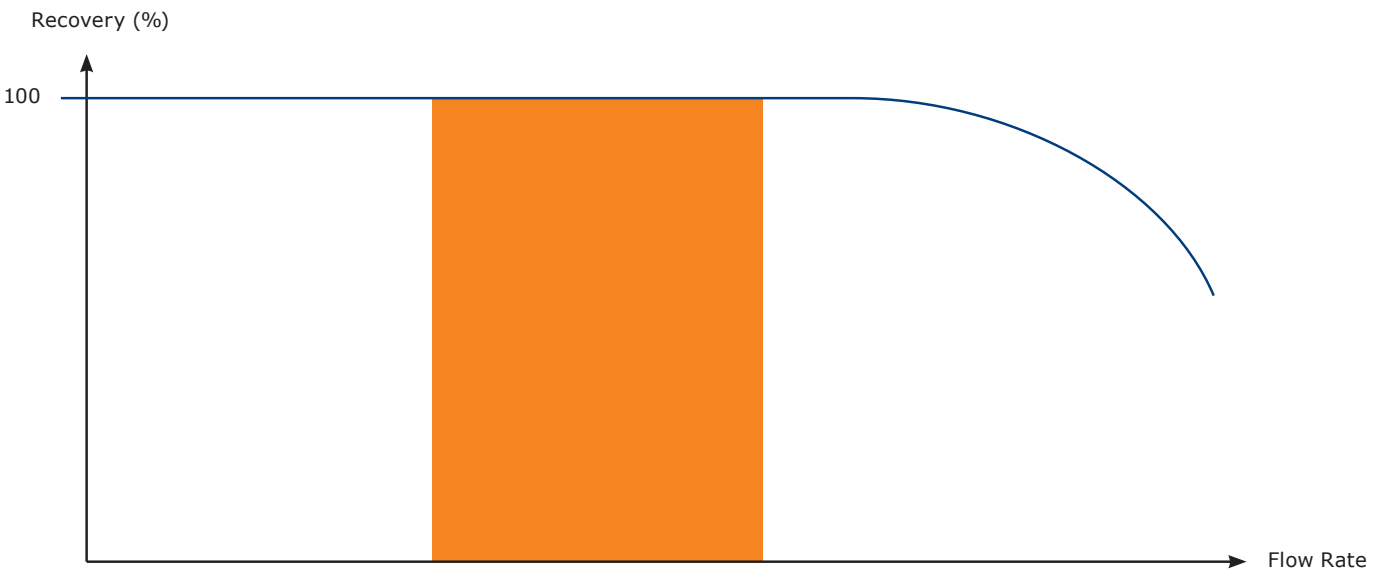

Figure 5. Analyte elution solvent flow rate vs. extraction efficiency

Maintenance and Troubleshooting

If collection tubes are used routinely, the VacMaster will require little or no cleaning. If the 'two tank' option is used for biological or hazardous samples, prompt removal and disposal of the collected liquids will reduce the amount of routine cleaning needed.

If the glass tank needs to be cleaned, please use water and mild laboratory detergents. DO NOT use scouring powders or pads, or anything else that would scratch or damage the tank. Any damage to the glass tank can severely increase the risk of implosion and serious personal harm.

Troubleshooting

Problem	Cause	Remedy
No liquid flow through column	Column plugged	Replace column
		Filter samples to remove particulates. Use depth filter
	Sample too viscous	Dilute sample
No vacuum	No vacuum from source	heck vacuum source
	Vacuum controller not adjusted properly	Adjust fine and coarse control valves on VacMaster
	Air entering through unused ports	Use port sealing plugs in ports without columns
	Gasket on lid not sealing	Replace gasket
	Vacuum relief valve opened due to vacuum > minus 20" Hg	Adjust vacuum source and control valves to lower vacuum and restart
Solvent not flowing into collection tubes	Bent needles	Replace or straighten needles
	Stopcock (if used) is closed	Open stopcock
Liquid collecting in the bottom of the glass tank	Waste outlet fitting rotated up	Rotate fitting down and install drain tube
Tank lid will not close	Collection tubes above tank rim	Lower bottom plate of collection plate
Liquid collecting in vacuum	Liquid is leaving tank	Rotate waste outlet fitting up tubing
	No collection trap between manifold and vacuum source	Install collection trap between manifold and vacuum source
Liquid in the collection tubes is disturbed when vacuum is released	Air is entering tank above tubes	Install air flow tube in right side of lid

Warranty

Biotage products are warranted to be free from defects in materials and workmanship for a period of ninety (90) days from the shipment date. Under this warranty, Biotage will either repair or replace products that are defective provided that the product has not been misused or modified in any way.

While every effort is made to ensure the quality of the Biotage® VacMaster™, misuse or damage incurred in use can seriously compromise the structural integrity of the product. Consequently, Biotage can accept no liability for injury or damage caused by the VacMaster or its accessories.

Returns

Returns are accepted by prior authorisation. Please contact your local Biotage distributor for a return authorization number.

Ordering Information

Part No.	Description	Qty.
VacMaster-10 for processing up to 10 samples simultaneously		
121-1010	Complete with 10 mm diameter collection tube rack	
121-1012	Complete with 12 mm diameter collection tube rack	
121-1016	Complete with 16 mm diameter collection tube rack	
121-1027	Complete with 27 mm diameter collection tube rack	
VacMaster-20 for processing up to 20 samples simultaneously		
121-2010	Complete with 10 mm diameter collection tube rack	
121-2012	Complete with 12 mm diameter collection tube rack	
121-2016	Complete with 16 mm diameter collection tube rack	
Needles and stopcocks for VacMaster-10 and -20		
121-0001	PTFE stopcock / needle unit	10
121-0002	PTFE needle unit	10
121-0003	Stainless steel needles	20
121-0004	Stainless steel needle retainer	10
121-0005	Port sealing plugs	30
121-0009	PTFE stopcock	10
121-0009-S	PTFE stopcock- positive pressure	10
Large volume extraction kits		
Suitable for the simultaneous extraction of up to 10 large volume water samples using the VacMaster SPE manifold. Four options are available to cover the complete ISOLUTE product range. The kit includes 10 numbered PTFE tubes fitted to appropriate adaptors.		
121-2090	VacMaster LVE kit for 1, 3 and 6ml columns (A, B and C)	
121-2091	VacMaster LVE kit for 15 and 25ml columns (D and E)	
121-2092	VacMaster LVE kit for 60ml columns (F)	
121-2093	VacMaster LVE kit for 6ml glass columns	
121-2094	VacMaster LVE kit for ISOLUTE-XL columns	
Components for VacMaster-10 and -20		
121-0040	VacMaster rack dome nut	

Part No.	Description	Qty.
121-0041	VacMaster rack nut washer	
121-0042	VacMaster rack foot	
121-0045	VacMaster rack leg	
Components for VacMaster-10		
121-0043	VacMaster 10 rack handle	
121-1030	Silicone Lid Gasket	
121-1039	Spare glass tank with waste outlet fitting	
121-1045	Complete lid (tested)	
121-1132	VacMaster 10 rack 10mm tubes	
121-1133	VacMaster 10 rack 12mm tubes	
121-1134	VacMaster 10 rack 16mm tubes	
121-1131	VacMaster 10 rack 27mm tubes	
121-1135	VacMaster 10 top/mid plate 10mm	
121-1136	VacMaster 10 top/mid plate 12mm	
121-1137	VacMaster 10 top/mid plate 16mm	
121-1138	VacMaster 10 top/mid plate 27mm	
121-1143	VacMaster 10 lower plate	
Components for VacMaster-20		
121-0044	VacMaster 20 rack handle	
121-2059	VacMaster 20 silicone lid gasket	
121-2068	Spare glass tank with waste outlet fitting	
121-2075	Complete lid (tested)	
121-2161	VacMaster 20 rack 10mm tubes	
121-2162	VacMaster 20 rack 12mm tubes	
121-2163	VacMaster 20 rack 16mm tubes	
121-2164	VacMaster 20 top/mid plate 10mm	
121-2165	VacMaster 20 top/mid plate 12mm	
121-216	VacMaster 20 top/mid plate 16mm	
121-2173	VacMaster 20 lower plate	
Vacuum Pump and Supplies		
121-9602	Vacuum control unit with integral vacuum generator	
121-9240	Vacuum Pump, 240V / 50 Hz	
121-9115	Vacuum Pump, 115V / 60 Hz	
121-0010	PTFE T-valve	
121-2095	VacMaster trap kit	
121-2096	Vacuum Flask with sidearm	
121-2097	Flask stopper with 1 tubing connector	
121-2098	1.5m of vacuum tubing	
121-2099	Replacement gasket	


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