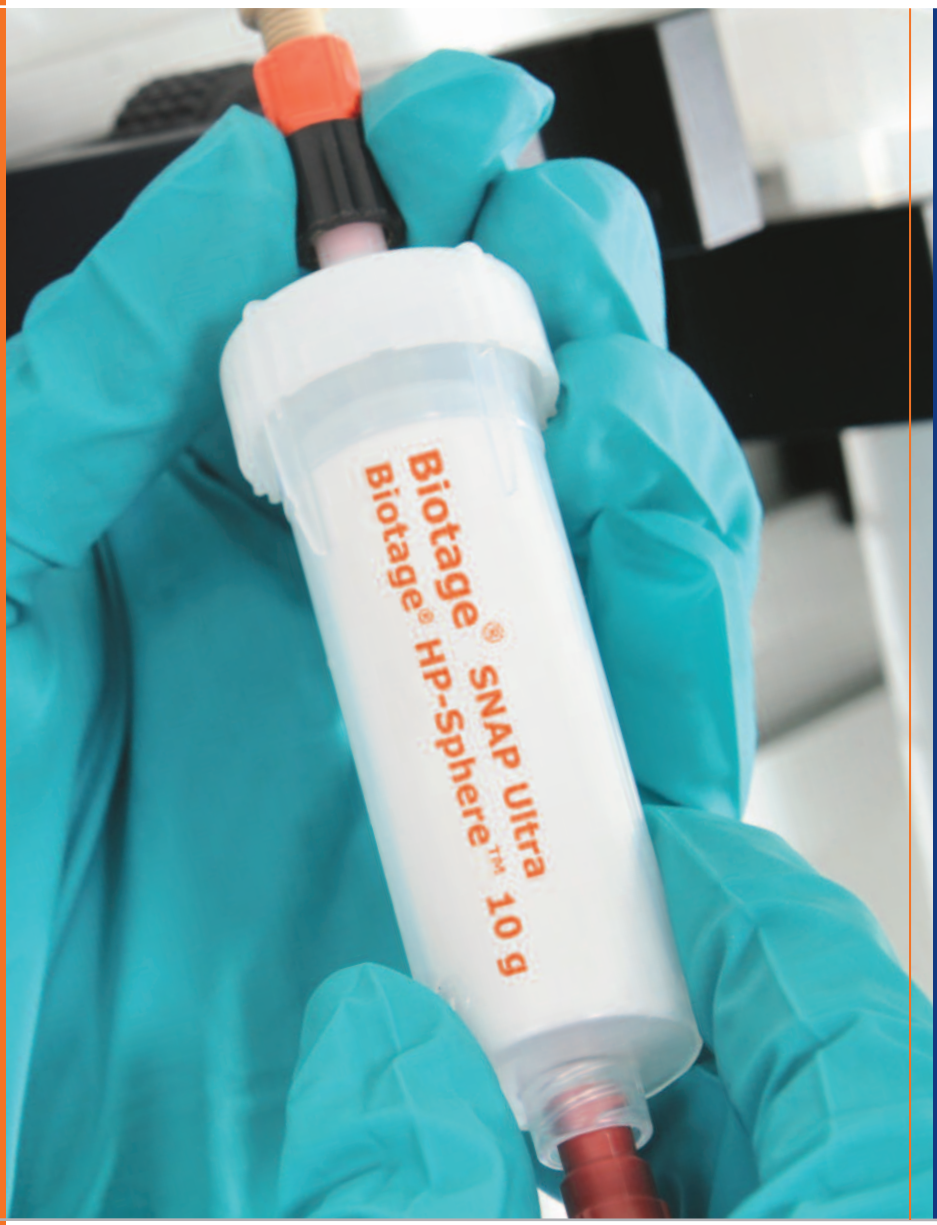
Flash Purification
Cartridges & Method Development



Flash Cartridge / Instrument Compatibility Table

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Biotage® SNAP
Biotage SNAP Ultra
Biotage SNAP XL
Biotage ZIP™
Samplet®
Dry Load Vessels
Flash 75 and Flash 150
Flash 400

Accessories
TLC Plates
Liquid Sample Injection Valves & Adapters
Cartridge Adapters & Holders
FlashPack Plunger Assemblies

Stationary Phases for Flash Purification

Flash Purification Method Development
Normal-Phase
Reversed-Phase

Biotage®
www.biotage.com

Flash purification cartridges for better, more reproducible separations

From routine to highly specialized applications, Biotage® has your solution

In 1994, Biotage was the first company to develop pre-packed cartridges for flash purification, and has been the leader in quality, performance and innovation ever since.

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Biotage Flash Purification

Flash purification is a technique developed by Professor W.C. Still that uses a column or cartridge filled with an insoluble solid support (stationary phase) and elution solvent mixture (mobile phase) to separate and purify a mixture of organic compounds. The stationary phase and the mobile phase typically have very different polarities, which work in tandem to separate compound mixtures. The separated molecules can then be collected in a purified state for use in a subsequent synthesis or as a final product.

In 1994, Biotage was the first to develop and introduce pre-packed cartridges for flash purification. A broad selection of distinct cartridge styles now enable professionals to choose the cartridge which best suits the purification need and purification system:

Biotage SNAP **Flash 75**
Biotage SNAP Ultra **Flash 150**
Biotage SNAP XL **Flash 400**
Biotage ZIP

All Biotage cartridges are designed to meet the requirements of HPFC (high-performance flash chromatography) systems including Biotage Isolera Prime™, Biotage Isolera™ One, Four and LS, Biotage SP1, Biotage SP4, and Biotage FlashMaster. Automated cartridge-packing techniques ensure efficiently packed Biotage flash cartridges minimize performance variability. Cartridge sizes range from 5 g to 40+ kg for purification scales ranging from milligrams to kilograms. Manufactured from polypropylene to meet the extractable requirements in US 21 CFR 177.1520 and packed using proprietary methods that strictly adhere to ISO 9001:2000 quality standards, Biotage cartridges also undergo QC testing and production control. Each Biotage SNAP cartridge is laser-etched with a unique lot number to ensure traceability.

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Flash Cartridge/Instrument Compatibility

Cartridge	Media Mass	Automated Systems				Manual Systems		Scale-up Systems			
		Biotage Isolera™ One	Biotage Isolera Four	Biotage Isolera LS	Biotage Isolera Prime™	Biotage FlashMaster Personal	Biotage FlashMaster PersonalPlus	Biotage Isolera LS	Flash 75	Flash 150	Flash 400
Biotage SNAP and **Biotage SNAP Ultra**	10 g	●	●		●	●	●				
	25 g	●	●		●	●	●				
	50 g	●	●	●	●	●	●	●			
	100 g	●	●	●	●	●	●	●			
	340 g	●	●	●	●	●	●	●			
Biotage SNAP XL	750 g	●	●	●	●			●	●	●	
	1500 g			●				●	●	●	
Biotage ZIP™	5 g	●	●		●	●	●				
	10 g	●	●		●	●	●				
	30 g	●	●		●	●	●				
	45 g	●	●		●	●	●				
	80 g	●	●	●	●	●	●	●			
	120 g	●	●	●	●	●	●	●			
Flash 75S	200 g	●	●	●				●	●		
Flash 75M	400 g	●	●	●				●	●		
Flash 75L	800 g	●	●	●				●	●		
Flash 150M	2.5 kg			●				●		●	
Flash 150L	5 kg			●				●		●	
Flash 400M	20 kg										●
Flash 400L	40 kg										●

For more information on Biotage flash purification instruments please see our Flash Systems brochure.

● = Attaches directly

● = Requires external cartridge stand or adapter

Biotage® SNAP

Flexibility, performance, and high-value

The Biotage SNAP family of flash cartridges is the recognized industry standard for professionals worldwide. Available in a wide range of sizes for practically any situation, Biotage SNAP cartridges deliver the purification efficiency and favorable separation time to meet the growing demands of a global economy.

The Biotage SNAP cartridge design enables seven types of loading techniques including three internal dry loading options. They are packed to provide the highest resolution of any 50 µm particle cartridge on the market providing increased loading capacity and better resolution. Biotage SNAP cartridges are constructed using USP Class VI plastics (medical-grade) for lower extractables and cleaner fractions.

Biotage SNAP cartridges are ready-to-use flash columns designed to withstand 100 psi (7 bar) without the use of compression modules. Optimal cartridge packing protocols produce cartridges that deliver larger loading capacities, tighter elution bands, and higher purity fractions. Biotage SNAP cartridges are tested to ensure they meet stringent performance standards including efficiency (plate count) and peak shape (symmetry).

Available in sizes from 10 g to 340 g with the choice of silica, C18, or NH functionalized media, Biotage SNAP cartridges will purify your valuable compounds whether you have low mg samples or multi-gram samples.

For maximum sample loading and the best separation, dry loading the sample using Biotage SNAP Samplet® cartridges gives the best performance by eliminating any dissolution solvent effects.

See page 8 for more information on Biotage SNAP Samplet cartridges.

Advantages

- Universal fit onto all flash systems
- 3000 N/M minimum performance provides narrower elution bands increasing sample load
- Up to 100 psi / 7 bar pressure rating enables faster flow rates and use with viscous solvents
- 20% more loading capacity than competitive cartridges
- Higher peak resolution than competitive cartridges
- Luer-lock connections eliminate adapters and provide compatiblity with most flash systems
- Removable cap allows internal sample loading
- 3000 N/M minimum performance provides narrower elution bands increasing sample load
- Up to 100 psi / 7 bar pressure rating enables faster flow rates and use with viscous solvents
- Translucent barrel provides assurance that solvent is flowing and separation is occurring
- USP Class VI construction materials minimize extractables providing cleaner purified products (**Figure 1**)
- Removable cap with extra column head space allows Samplet and bulk dry-loading to improve purification performance
- Three standard silica-based media provide selectivity choices for optimal purification
- Pre-packed Samplet cartridges increase loading capacity and produce tighter elution bands by removing the injection solvent effect
- Individually lot numbered for traceability

Available Media

- Biotage KP-Sil — 50 µm
- Biotage KP-C18-HS — 50 µm
- Biotage KP-NH — 50 µm

Recommended Instruments

- Biotage Isolera™ flash purification family
- Compatible with instruments requiring Luer-lock connections

Optional Accessories

- Dry loading vessels
- 3-way injection valves
- Samplet cartridges
- Adapters

See **Flash Cartridge/Instrument Compatibility Chart** for the Biotage SNAP product that best fits your flash purification needs.

Cartridge Selection / Performance

Biotage SNAP	10 g	25 g	50 g	100 g	340 g*	750 g	1500 g	Efficiency (N/m)	Symmetry
Normal-phase (Biotage KP-Sil)	1	1	1	1	1	1	1	≥3000	0.7–1.5
Reversed-phase (Biotage KP-C18-HS)	1	1	1	1	1	1	1	≥3000	0.7–1.5
Amine Purification (Biotage KP-NH)	1	1	1	1	1	1	1	≥3000	0.7–1.5

**Maximum pressure of 75 psi (5 bar)*

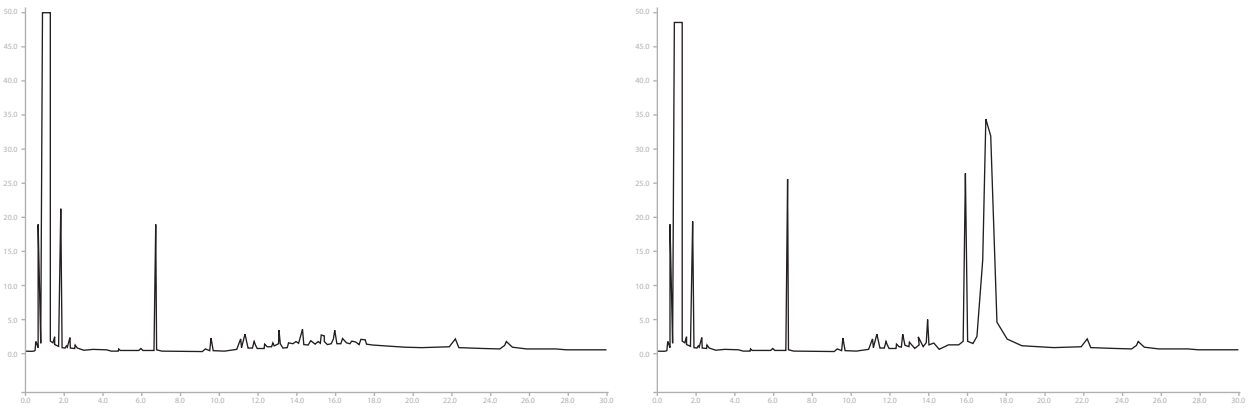


Figure 1. Biotage SNAP cartridges, manufactured from materials meeting USP Class VI extractables requirements, reduce the amount of extractables and leachables generated by cartridge construction materials. The gas chromatography analysis above show the results of DCM washes (4 liters) of a Biotage SNAP 1500 g cartridge (left) and a competitive 1500 g cartridge (right). Lower extractables ensure higher purity fractions.

Ordering Information — see page 24–27

Biotage® SNAP Ultra

The highest purification performance

Biotage SNAP Ultra flash chromatography cartridges deliver the highest purification performance available with the highest column loading capacity utilizing Biotage HP-Sphere™, spherical silica delivering 40% more surface area.

The highest performance available
Precision engineered Biotage SNAP Ultra cartridges deliver double the purification capacity of other flash cartridges by utilizing Biotage HP-Sphere, small particle, 25 µm spherical silica with a 40% increase in surface area. The higher surface area provides twice the loading capacity of lower surface area silicas. This improved load capacity means that a smaller SNAP Ultra cartridge can be used to replace a more expensive and larger competitive cartridges.

The small, 25 µm spherical particles minimize band-spreading and back-pressure enabling the use of faster flow rates and steeper gradients to speed purification and improve productivity.

Designed for the Biotage Isolera™ and other flash chromatography systems
Isolera software and Biotage SNAP Ultra cartridges work together as a system to produce pure compounds the first time. Luer lock inlet and outlet ports ensure robust connection to the Biotage Isolera or any other flash chromatography system.

Wide range of sizes for scalability
Biotage SNAP Ultra cartridges are available from 10 g to 340 g sizes providing simple and direct scale-up of samples from low milligrams to multi-grams

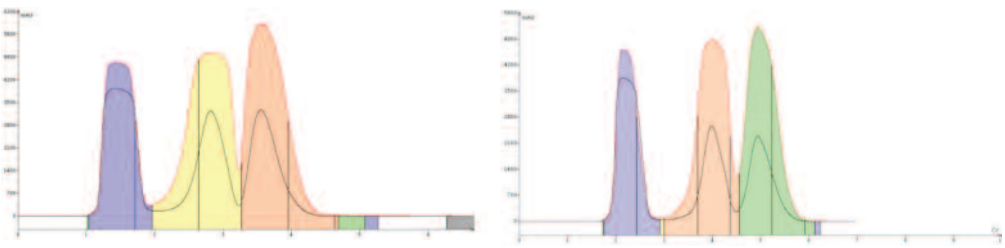


Figure 2. The very high surface area of the spherical, 25 µm Biotage HP-Sphere silica enables the use of smaller Biotage SNAP Ultra cartridges in place of a larger flash cartridge. In this example, a Biotage SNAP Ultra 50 g cartridge (far left) actually purifies more sample than a competitive 80 g high-performance cartridge saving 38% in solvent use and run time

Advantages

- Biotage HP-Sphere, spherical silica with 40% more surface area delivers the highest sample loading available to reduce purification costs
- Smaller, 25 um silica delivers the best peak resolution and higher concentration fractions reducing solvent evaporation time
- Removable cap provides internal sample loading, both liquid and dry to improve purification performance
- Samplet® cartridge compatibility to pre-concentrate samples and eliminate solvent dissolution
  - Pre-packed Samplet cartridges increase loading capacity and produce tighter elution bands by removing the injection solvent effect
- Low back pressure enables faster flow rates and use with viscous solvents
- Medical-grade polypropylene reduces leachables that can contaminate purified compounds
- Individually lot numbered for traceability
- Designed to be the perfect complement to Biotage Isolera chromatography systems
- Universal fit onto all flash systems with Luer inlet and outlet connections

Specifications

Materials	Tubes: inert, medical-grade polypropylene (USP Class VI) Frits: inert polyethylene
Pressure limit	100 psi (7 bar) 340 g max pressure 75 psi (5 bar)
Resolution	Minimum 7000 N/m (plates per meter)
Quantity	20/case, 6/case for 340 g
Compatibility	Universal Luer connections
Sizes	10, 25, 50, 100 and 340 g cartridges

Recommended Instruments

- Biotage Isolera™ flash purification family
- Compatible with instruments requiring Luer-lock connections

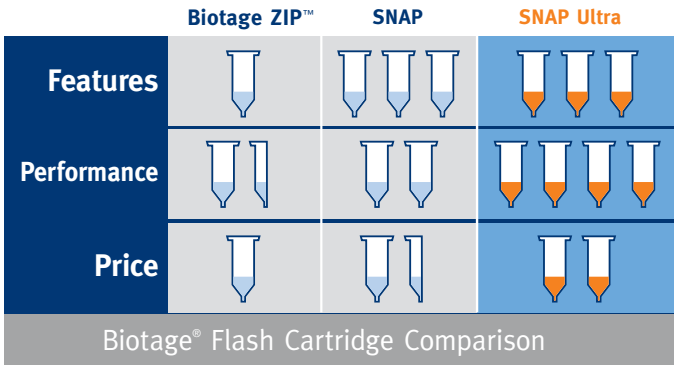
Optional Accessories

- Dry loading vessels
- 3-way injection valves
- Samplet® cartridges
- Adapters

See **Flash Cartridge/Instrument Compatibility Chart** for the Biotage SNAP Ultra product that best fits your flash purification needs.

Performance like this means that cartridges can be loaded with twice the amount of sample to be purified. That means you can use a cartridge that is half the size that you would normally use. A smaller, high surface area cartridge takes less time and less solvent to do the job of a cartridge twice the size.

- Higher loading per gram of silica means smaller cartridges can be used to perform any separation
- Smaller cartridges use less solvent and require less time
- Chemists produce more compounds in less time
- Less solvent use also means less generated waste – a major ecological improvement



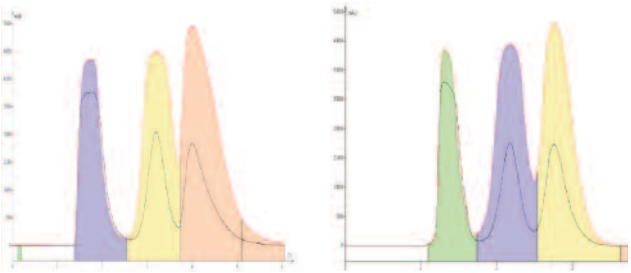


Figure 3. Biotage SNAP Ultra silica has 40% higher surface area than other spherical flash silica and delivers increased loading capacity. At 4% load (4 grams sample per 100 grams of silica) a 25 g Biotage SNAP Ultra cartridge (far left) provides an equivalent separation as a competitive 25 g, 30 µm silica cartridge with a 2% sample load.

Ordering Information — see page 24–27

Biotage® SNAP XL

Cartridges for development-scale purification

SNAP 750 g and 1500 g cartridges address a growing need for optimized gram-to-150+ g-scale purification, increasing purification efficiency while reducing costs.

SNAP XL cartridges are rugged and laser welded for safe operation at pressures up to 100 psi, enabling higher flow rates and the use of higher viscosity solvents.

High Productivity

Operating at flow rates up to 500 mL/min, Biotage SNAP XL cartridges allow you to quickly purify large sample masses, saving hours or even days of purification runtime.

Direct Scale-up

With greater than 10% sample loading capacity possible, Biotage SNAP XL cartridges provide seamless scale-up from milligrams to >150 g simply and efficiently without method modification see (**Figure 4**).

Biotage SNAP XL cartridges are available in three media – Biotage KP-SIL, Biotage KP-C18-HS, and Biotage KP-NH enabling direct scale-up from smaller Biotage SNAP cartridges.

Advantages

- Laser welded for strength and safety
- High loading capacity increases purification throughput
- Seamless scale up from other Biotage flash cartridges
- Up to 100 psi / 7 bar pressure rating enables faster flow rates
- Translucent barrel provides assurance that solvent is flowing and separation is occurring
- USP Class VI construction materials minimize extractables providing cleaner purified products

Available Media

- Biotage KP-Sil — 50 µm
- Biotage KP-C18-HS — 50 µm
- Biotage KP-NH — 50 µm

Recommended Instruments

- Biotage Isolera™ One
- Biotage Isolera Four
- Biotage Isolera LS
- Compatible with most manufacturers' development-scale instruments

Optional Accessories

- 3-way, large-bore injection valve
- Inlet and outlet Luer fittings
- Cartridge holder for Biotage Isolera systems
- External dry load vessel (DLV-500)

Cartridge Selection / Performance

Biotage SNAP XL	750 g	1500 g	Efficiency (N/m)	Symmetry
Normal-phase (Biotage KP-Sil)	1	1	3000	0.7–1.5
Reversed-phase (Biotage KP-C18-HS)	1	1	3000	0.7–1.5
Amine Purification (Biotage KP-NH)	1	1	3000	0.7–1.5

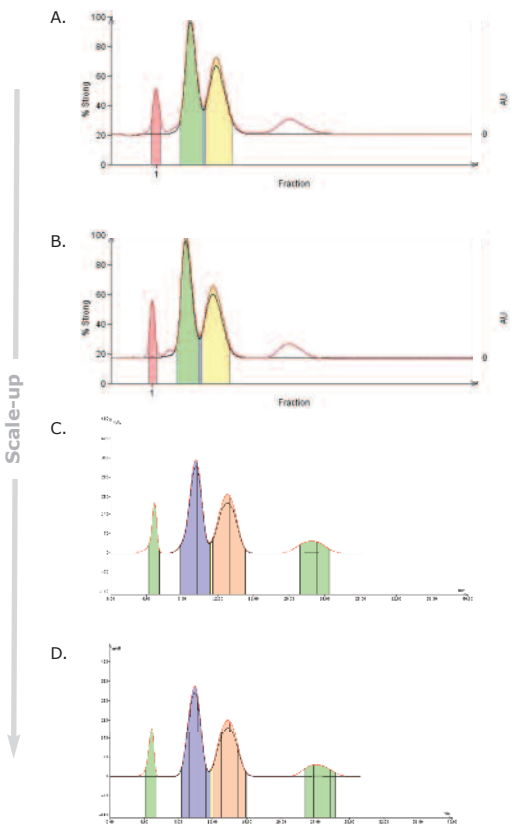


Figure 4. Successful scale-up using Biotage SNAP KP-C18-HS 12 g, 60 g, 950 g, and 1850 g cartridges shows direct scalability even with closely eluting compounds.
(A.) 12 g Biotage SNAP C18 1% load mixed probes 10 mL/min 60:40 MeCN:H_20
(B.) 60 g Biotage SNAP C18 1% load mixed probes 50 mL/min 60:40 MeCN:H_20
(C.) 950 g Biotage SNAP XL C18 1% load mixed probes 250 mL/min 60:40 MeCN:H_20
(D.) 1850 g Biotage SNAP XL C18 1% load mixed probes 500 mL/min 60:40 MeCN:H_20

Ordering Information — see page 24–27

Biotage ZIP™

Simplicity, performance and high-value

Biotage ZIP flash cartridges are an evolution in Biotage's long history of manufacturing flash purification solutions. Biotage ZIP cartridges deliver industry-leading performance that meet the difficult challenges of day to day purification. Plug and play Biotage ZIP cartridges are the perfect compliment to all Biotage Isolera™ flash chromatography systems.

High performance at a value price
Biotage ZIP cartridges are engineered to meet the needs of chemists requiring high performance and consistency from a purification cartridge to ensure delivery of pure compounds. Biotage ZIP cartridges are laser-welded to ensure leak-free operation even at elevated pressures.

Plug and play design
Constructed with industry-standard Luer lock inlet and Luer tip outlet ports, Biotage ZIP cartridges are truly universal in their use with flash systems from around the world. No adapters are needed, so installation is quick and easy.

Wide range of sizes and scalable
Biotage ZIP cartridges are packed with Biotage KP-Sil brand silica which is used in all Biotage silica flash cartridges. Available in sizes from 5-120 g, Biotage ZIP cartridge purifications can be scaled up to larger Biotage cartridges including Biotage SNAP 340 g, 750 g and 1500 g, Flash 75 and 150, and even Flash 400 without method modification.

Advantages

- 20% more loading capacity than competitive cartridges
- Up to 150 psi / 10 bar pressure rating enables faster flow rates and use with viscous solvents
- Translucent barrel provides assurance that solvent is flowing and separation is occurring
- Consistent performance provides reliable results
- Laser-welded inlet fitting provides leak-free operation and high pressure tolerance
- Luer tip outlet is compatible with all flash systems
- Automated manufacturing process provides better cartridge reliability, reproducibility and performance over lesser quality competitive products

Specifications

Materials	Tubes: inert polypropylene Frits: polyethylene 40-63 µm Biotage KP-Sil
Pressure limit	Stable to 150 psi (10 bar) 80 g max pressure 120 psi (8 bar)
Quantity	Packages of 20
Compatibility	Universal Luer connections, compatible with all flash systems
Sizes	5, 10, 30, 45, 80 and 120 g cartridges

Optional Accessories

- Dry loading vessels
- 3-way injection valves
- Adapters

Recommended Instruments

- Biotage Isolera™ flash purification family
- Compatible with instruments requiring Luer connections

See **Flash Cartridge/Instrument Compatibility Chart** for the Biotage ZIP product that best fits your flash purification needs.

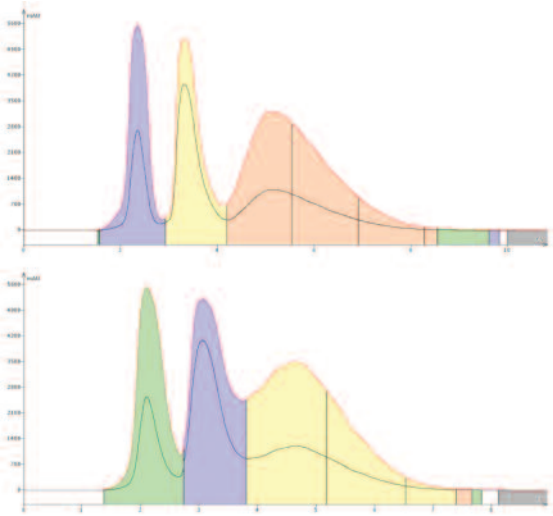


Figure 5. A 30 g Biotage ZIP cartridge (top) and a competitive 30 g flash cartridge with spherical silica (bottom) are used to isocratically separate a 3-component mix. The Biotage ZIP cartridge provides more compound resolution and sharper peaks for the same sample load.

Ordering Information — see page 24–27

Samplet® Cartridges

Internal dry loading improves separations

Samplet cartridges are developed for quick and convenient sample introduction acting as sample pre-concentrators and guard cartridges. After the sample has been applied to the Samplet cartridge and the solvent evaporated, the Samplet cartridge is inserted into the flash cartridge, providing a dry, concentrated sample for purification. Dried, adsorbed samples enhance the separation and improve compound recovery, purity, and loading capacity (**Figure 6**). Samplet cartridges are available for both Biotage® SNAP and FLASH+® cartridges.

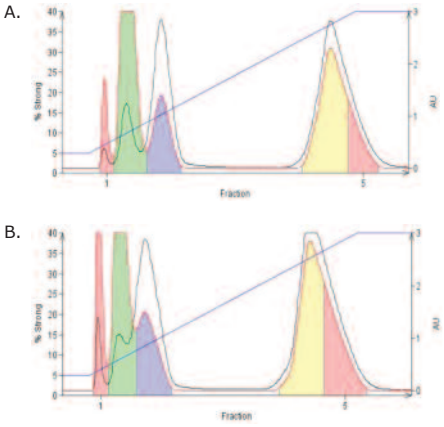


Figure 6. Increased performance of a Samplet-loaded cartridge (A) versus a liquid-loaded cartridge (B) is seen by the improved peak resolution. By allowing the sample to dry in the Samplet cartridge, the sample diluent's strong displacement effects are eliminated and improved purification is achieved.

DLV-030

DLV-500

Dry Loading Vessels

Improve purification results with higher sample loads

One of the most common flash purification challenges is dealing with hard-to-dissolve crude samples. Because polar solvents cause poor chromatographic results when used as injection solvents in normal-phase flash chromatography, other sample load options are needed.

A commonly used option is dry loading, which involves dissolving the sample in a suitable solvent, mixing with an inert, clean, dry adsorbent, such as silica, alumina, or diatomaceous earth, and drying the slurry. The dried sample is then loaded into an empty vessel and inserted ahead of the purification cartridge. By drying the mixture, the polar solvent is removed and will have no impact on the purification. Dry load vessels are available for use with all cartridges. For Flash 75 and Flash 150, repackable Biotage SIM modules in sizes from 100 mL to 2 L are available.

Advantages

- Improved sample separation
- Higher loading capacity
- Increased fraction purity

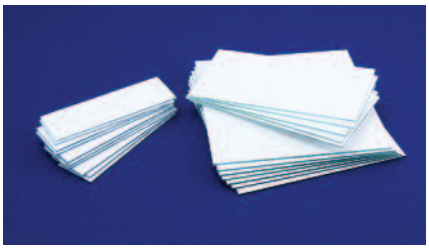
DLV Accessories

- Replacement barrels and frits
- DLV holders

Biotage SIM Accessories

- Replacement frits
- Replacement filter

Accessories

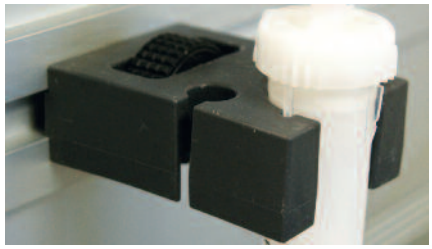


Thin-Layer Chromatography (TLC) Plates

TLC is a commonly used method development tool for flash purification. Product mixtures separated using TLC generally can be purified by flash chromatography using the identical solvent system. TLC to flash method transfer accuracy is improved when TLC plates and flash cartridges made with identical silica from Biotage are used. For synthetic chemists, the benefits of matched TLC plates and flash cartridges are better purification throughput, increased compound purity and yield, and reduced solvent cost.

Liquid Sample Injection Valves and Adapters

For liquid samples, Biotage offers two 3-way injection valves that attach directly to Biotage cartridges and compression modules. These stainless steel valves come complete with finger tight fittings and a Luer adapter for syringe injection. The straight-through injection design minimizes wash volume and minimizes precipitation potential.



Cartridge Holders

Designed for simple attachment onto Biotage Isolera™ systems, these cartridge holders accommodate 10 g, 25 g, 50 g, 100 g, 340 g, 750 g and 1500 g Biotage SNAP cartridges. A FLASH+ cartridge holder is also available.

Cartridge Adapters

Luer-lock to Luer tip adapters enable Biotage SNAP cartridges to be used with Biotage FlashMaster, Isco and other competitive flash systems. The very easy to install adapter attaches directly to the Biotage SNAP cartridge outlet converting the Biotage SNAP cartridge from Luer lock to Luer tip.

FlashPack Plunger Assemblies

ISOLUTE® flash chromatography columns use a plunger assembly for compatibility with Biotage FlashMaster flash chromatography systems. The plungers are adjustable to accommodate virtually any bed mass including dry loaded samples.

Ordering Information — see page 24–27

Flash 75 and Flash 150

The industry standard original for development-scale cartridges

The original flash cartridges invented by Biotage® deliver excellent purification, ease of use and are available in 75 mm and 150 mm ID. Additionally, these development-scale cartridges provide a straightforward purification scale-up path from other flash cartridges.

Routinely operating at a flow rate of 250 mL/min, Flash 75 systems and Flash 75 cartridges allow you to scale-up and quickly complete runs, saving hours or even days of purification time compared to using glass-column flash purification.

Radial Compression Improves Separations

Flash 75 and 150 cartridges operate in radially-compressed barrels that squeeze the cartridge walls improving bed density and minimizing the chance of voiding and channeling

Reliable Gram-scale Purification

Flash 75 and 150 cartridges provide a direct scale-up pathway from smaller scale Biotage flash cartridges. Five cartridge sizes — 200 g, 400 g, and 800 g (Flash 75), and 2.5 kg and 5 kg (Flash 150) enable purification from tens of grams to hundreds of grams of crude reaction mixture.

Media Options

Flash 75 and 150 cartridges are available with many media choices to enable direct scale-up from smaller-scale Biotage cartridges and chemisorption resins. Choose from Biotage KP-Sil, Biotage KP-C18-HS, Biotage KP-NH, activated carbon, HP20, or HP20SS.

Advantages

- Compression modules radially compress Flash 75 and Flash 150 cartridges to maximize sample contact with silica (higher sample load) and separation performance (greater purity, recovery)
- Compression modules seal up to 100 psi, ensuring leak-free operation even with high flow rates and reversed-phase solvents
- Knife-edge sealing mechanism in the Flash 75 and Flash 150 compression modules seals to 100 psi without o-rings

Recommended Instruments

- Flash 75
- Flash 150

Optional Accessories

- Biotage SIMs (Sample injection module)
- 3-way injection valve

Cartridge Selection

Development Scale	Biotage KP-Sil	Biotage KP-C18-HS	Flash-AC	Diaion® HP20	Diaion HP20SS
75 mm	1	1	1	1	1
150 mm	1	1	1	1	1

Specifications

	Diameter (mm)	Bed Length (cm)	Packing Weight (g) (nom)	Column Volume (mL)	Flow Rate (mL/min)	Easy ΔCV = 4+	Typical ΔCV = 2–3.9	Difficult ΔCV = 0.1–1.9
Flash 75S	75	9	200	320	250	5–10	1–5	0.2–1
Flash 75M	75	15	400	535	250	10–20	2–10	0.4–2
Flash 75L	75	30	800	1070	250	20–40	4–20	0.8–4
Flash 150M	150	300	2500	4300	500–1000	80–160	16–80	3–16
Flash 150L	150	600	5000	8600	500–1000	160–320	32–160	6–32

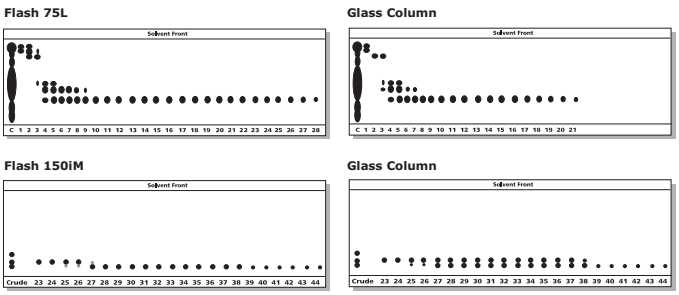


Figure 7. The TLC of the collected fractions in the Flash 75L and 150M vs. glass column comparisons show more pure fractions were collected vs. the glass column. That improvement along with a faster flow rate yielded a throughput enhancement of two times over the glass column.

Routinely operating at a flow rate of 250 mL/min, the Flash 75 systems and Flash 75 cartridges allow you to scale-up and quickly complete runs, saving hours, even days, of purification time compared to using glass-column flash purification.

Flash 150 vs. Glass Comparison

	Flash 150M	Glass Column
Column Size (mm)	150 x 300	120 x 660
Silica Volume (kg)	2.5	3
Sample Load (g)	180	450
Flow Rate (mL/min)	500	70
Number of Fractions	45	30
Purification Time (min)	90	430
Pure Compound (g/run)	70.5	45
Recovery (%)	87.0	22.2
Purification Throughput (g/hr)	120	63

In this application the Flash 150 system saved nearly four weeks of purification time on a 1 kg scale synthesis project.

Ordering Information — see page 24–27

Advantages

- Can purify up to 4+ kg of crude reaction mixture
- Minimize exposure to highly active or toxic compounds
- Improves safety by eliminating the need to handle kilogram amounts of media
- Shipped in a re-sealable container for disposal and incineration

Recommended Instruments

- Flash 400

Available Media

- Biotage KP-Sil
- Biotage KP-C18-HS (reversed-phase)
- Biotage KP-NH (amine-functionalized)
- Mitsubishi Diaion® HP20 and HP20SS
- Activated carbon

Flash 400

The industry standard original for process-scale purification

Biotage® Flash 400 cartridges are pre-packed cartridges (400 mm ID) designed for large-scale chromatography, and radially compressed to provide maximum performance and reliability. Flash 400 cartridges are faster, safer and easier to use than traditional glass and steel columns. Built to last and engineered to perform, Flash 400 systems and cartridges are the first choice of companies around the world for critical adsorption purification.

For more information on Flash 400 systems, please refer to the Biotage flash systems brochure.

Flash 400 systems have interchangeable barrels for use with either 400 mm x 30 cm (Flash 400M) or 400 x 60 mm (Flash 400L) cartridges. A system includes a compression module of one size, and the module of the other size can be ordered as an interchangeable option.

- Ensures highest purity, yield and throughput
- Designed for both chromatographic purification and adsorption processing of a variety of organic synthetic and natural products
- Minimizes exposure to highly active or toxic compounds
- Available with normal- and reversed-phase silica, activated carbon, polymeric adsorbents or custom-packed media

Specifications

	Flash 400M	Flash 400L
Diameter (mm)	400	400
Bed length (cm)	30	60
Flow rate (L/min)	1–7	1–7
Column Void Volume (L)	28	56
Biotage KP-Sil Silica Packing Weight (kg)	20	40
Biotage KP-C18-HS Packing Weight (kg)	24	48
Flash-AC Activated Carbon Packing Weight (kg)	13	26
Mitsubishi HP20 Packing Vol (L)	38	76

Stationary Phases for Flash Purification

Normal-phase Purification

Most organic synthesis products are organic solvent soluble — e.g. dichloromethane (DCM), acetone, ethyl acetate (EtOAc), etc. — and are lipophilic. Lipophilic molecules are typically separated using a polar stationary phase and a non-polar mobile phase. This technique is called normal-phase purification. Common mobile phases for normal-phase purification include hexane/EtOAc and DCM/MeOH. DCM/MeOH is primarily for organic molecules with highly polar functional groups (acids, amines, alcohols), which have a higher affinity for silica than esters, amides, ethers, etc.

In normal-phase purification, Biotage cartridges packed with Biotage KP-Sil, Biotage HP-SIL, or Biotage KP-NH are typically used.

Reversed-phase Purification

Some synthetic mixtures and natural products are soluble in more polar solvents such as MeOH, DMSO, DMF, MeCN, or water. Polar solvents are very disruptive to normal-phase mass-transfer kinetics and should only be used with reversed-phase purification. Reversed-phase purification uses a hydrophobic stationary phase with a polar mobile phase. Reversed-phases consist of a hydrocarbon, typically 18 carbons long, covalently bonded to silica. The bonding of this moiety creates a highly lipophilic environment, separating compounds on the basis of hydrophobic partitioning, similar to liquid-liquid extraction.

Unlike silica cartridges, reversed-phase cartridges can be re-used many times.

Four main purification modes available with Biotage cartridges

Normal-phase

Biotage HP-Sphere™
Biotage HP-Sphere is a true high-performance silica. Its spherical shape, 25 um particle size, and extremely high surface area combine to make Biotage HP-Sphere the most efficient flash silica available. Its spherical shape reduces backpressure while the 25 particle diameter and 700 m^2/g surface area combine to provide maximum resolving power and sample loads twice that of other silicas.

Biotage KP-Sil and Biotage HP-SIL
The most frequently used silica for flash purification features high surface area (500 m^2/g), moderate porosity (60 Å), a tight uniform particle distribution (40–63 µm), neutral pH, and low metals content. These factors combine to provide high loading capacity, efficiency, and reproducibility. Biotage HP-SIL in a smaller particle size range (20–30 micron average) is made of exactly the same silica as the larger particle Biotage KP-Sil. Methods developed on Biotage KP-Sil can easily be transferred to the higher resolution, smaller particle Biotage HP-SIL silica.

Normal-phase — amine functionalized

Biotage KP-NH
Biotage KP-NH chemistry shields synthetic organic amines from acidic silanols providing improved selectivity, peak shape, purity and yield. Unlike traditional silica and 1° amine (propyl amine) bonded silica, Biotage KP-NH does not require the use of chlorinated solvents or amine additives. Biotage KP-NH flash cartridges and matching TLC plates separate 2°, 3°, and heterocyclic amines using non-chlorinated solvents. Biotage KP-NH TLC plates are made using the same chemistry as Biotage KP-NH flash cartridges. Methods developed using Biotage KP-NH TLC plates accurately transfer to Biotage KP-NH flash cartridges simplifying flash purification.

Reversed-phase

Biotage KP-C18-HS
Reversed-phase flash chromatography is a very effective purification technique. Its main application areas include polar, ionizable and highly lipophilic compounds which cannot easily be separated by normal-phase techniques. Unlike normal-phase chromatography, reversed-phase uses a hydrophobic stationary phase (e.g. C18 or ODS) and hydrophilic mobile phases (methanol/water, acetonitrile/water). By converting silica's active, polar silanols sites to neutral, lipophilic sites, compounds that will either aggressively stick to silica or not stick at all can be retained, separated and eluted using water-based solvent systems.

Chemisorptive

Diaion HP20, HP20SS
HP20 and HP20SS are styrene-divinyl benzene copolymers primarily used as traps for organic molecules from aqueous fermentation solutions. HP20 has a particle size of 250–600 µm, while HP20SS has a particle size of 75–150 µm. Each has a high 600 m^2/g surface area, which allows a large concentration of organic materials to accumulate from aqueous solutions.

Activated carbon
For color, by-product, catalyst, or liposaccharide (LPS) pyrogen removal from active compound solutions prior to crystallization Biotage offers activated carbon packed into cartridges. Use of pre-packed cartridges is generally safer and more efficient than batchmode scavenging. Biotage activated carbon is scalable to Flash 400 and can be used in a cGMP environment when API cleanliness is required.

Physical Properties of Biotage Flash Chromatography Media

	Chemistry	Particle Size (µm)	Surface Area (m^2/g)	Pore Volume (mL/g)	Pore Diameter (Å)
Biotage HP-Sphere	Silica	25	700	0.9	50
Biotage KP-Sil	Silica	50	500	0.7	60
Biotage KP-C18-HS	C18	50	400	0.95	90
Biotage KP-NH	amine	50	230	0.6	100
ISOLUTE® NH2	1° amine	50	500	0.7	60
HP20	S-DVB	250–600	600	1.3	300–600
HP20SS	S-DVB	75–150	600	1.3	300–600
Activated Carbon	Carbon	45–105	—	—	—

Ordering Information — see page 24–27

Flash Chromatography Method Development

This guide covers the stages of optimizing flash chromatography for three popular types of flash purification methods — isocratic normal-phase, gradient normal-phase, and reversed-phase. These guidelines address important issues related to achieving successful flash purification.

Normal-phase

Stage 1: Converting TLC (thin-layer chromatography) R_f (retention factors) to CV (column volumes)

Stage 2: Determining the best solvent selectivity using TLC

Stage 3: Determining the best solvent strength using TLC

Stage 4: Determining the optimum cartridge size and sample load based on TLC data

Reversed-phase

Stage 1: Converting HPLC (high-performance liquid chromatography) retention times and gradient methods to CV

Stage 2: Determining the optimum cartridge size and sample load based on TLC data

Developing Normal-phase Methods — Isocratic

Stage 1: Converting TLC R_f to CV

Biotage recommends method development using Biotage TLC plates since the silica on the plates matches with cartridge flash silica. Retention on TLC plates is denoted by R_f. In flash purification, retention is usually measured in CV. Methods developed using TLC are generally transferable to flash chromatography because the relationship between R_f and CV is reciprocal, $CV=1/R_f$ (**Figure 8**).

R_f	CV
0.90	1.10
0.85	1.17
0.80	1.25
0.75	1.33
0.70	1.40
0.65	1.54
0.60	1.65
0.55	1.81
0.50	2.00
0.45	2.22
0.40	2.50
0.35	2.86
0.30	3.33
0.25	4.00
0.20	5.00
0.15	6.67
0.10	10.00

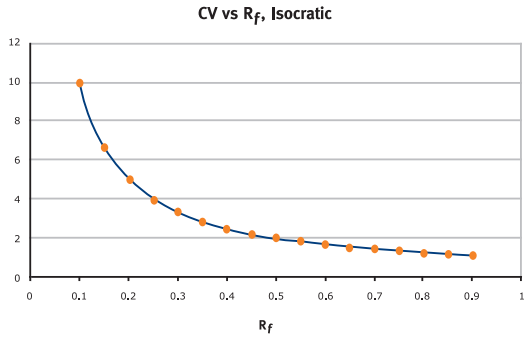


Figure 8. R_f to CV correlation, isocratic elution.

When scouting TLC solvent systems, it is important to realize a low R_f (0.15–0.35) is preferred because a lower R_f means a greater CV. Large CVs indicate increased compound-silica contact time, improving the chances of component resolution. Since CV is a measure of compound retention, then ΔCV is the measure of compound resolution, (see **Figure 9**). In flash purification, ΔCV dictates the sample load range possible for any given cartridge size, (see **Table 3** on page 21). For two adjacent components, a large ΔCV is desirable.

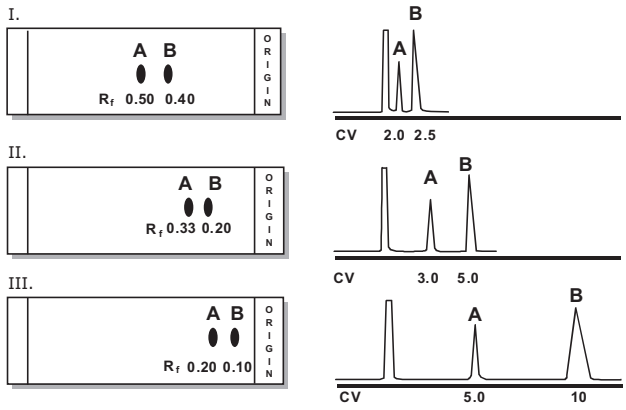


Figure 9. The R_f–CV relationship is illustrated in this graphic.

(I) Although compounds A and B are well resolved on TLC with R_f of 0.5 and 0.4, respectively, flash purification with the same solvent conditions provides low retention and low resolution (ΔCV = 0.5) for A and B, respectively.

(II) Lowering the R_f (A = 0.33, B = 0.20) provides increased retention and resolution (ΔCV = 2).

(III) Extremely high resolution (ΔCV = 5) is obtained by further reducing the compounds' R_f.

Stage 2: Determining the best solvent selectivity using TLC

The first step in successful flash purification is maximizing ΔCV. Accomplish this by evaluating various solvent mixtures by TLC. Look for a binary mixture that provides the largest ΔCV between the compound of interest and all the impurities. All solvents fall into one of the selectivity groups below. Each group has a different impact on a sample component's relative retention to another compound (selectivity). **Table 1** shows the most frequently used flash solvents and their selectivity groups.

When possible, optimization should include mixtures of hexane with ethyl acetate (VIa), methylene chloride (V), toluene (VII), tetrahydrofuran (III), and ether (I). For more polar compounds and amines, mixtures of methylene chloride (V) with methanol (II) or acetonitrile (VIb) should be evaluated. These solvent combinations provide a broad range of separation selectivity and will help define the correct solvents for purification (**Figure 10**).

Solvent	Selectivity Group
Ether	I
Methanol	II
Ethanol	II
Isopropanol	II
Tetrahydrofuran	III
Dichloromethane	V
Acetone	VIa
Ethyl acetate	VIa
Acetonitrile	VIb
Toluene	VII
Chloroform	VIII
Hexane	—
Heptane	—
Isooctane	—

Table 1. Commonly used flash chromatography solvents.

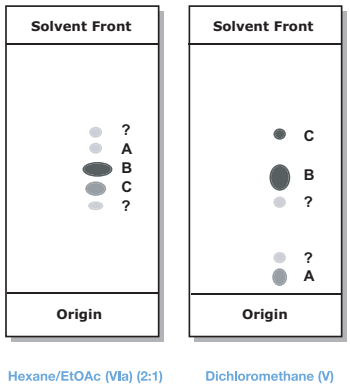


Figure 10. Impact of solvent selectivity on a chromatographic separation. In hexane/ethyl acetate the compound of interest (**B**) is poorly resolved from its major impurities (**A** and **C**). In dichloromethane, retention of impurities A and C has been dramatically altered, providing a better purification of B.

Stage 3: Determining the best solvent strength using TLC

When the correct solvents have been determined, the next step is to adjust the solvent composition (solvent strength) so the compound of interest elutes within the R_f range 0.15–0.35 (6.7–2.8 CV). By adjusting solvent strength to provide elution within this window, the chances for optimal purification are greatly enhanced. As with selectivity, each solvent has its own polarity (**Table 2**). Each solvent mixture or mobile phase then has its own unique solvent strength. Calculation of a solvent mixture's strength is useful for comparison to other solvent mixtures. Solvent mixtures with the same strength but different selectivity can then be evaluated.

Solvent	Solvent Strength
Methanol	0.95
Ethanol	0.88
Isopropanol	0.82
Acetonitrile	0.65
Ethyl acetate	0.58
Tetrahydrofuran	0.57
Acetone	0.56
Dichloromethane	0.42
Chloroform	0.40
Ether	0.38
Tolune	0.29
Hexane	0.01
Heptane	0.01
Isooctane	0.01

Table 2. A solvent mixture's strength is calculated using volume proportions and the individual solvent's strength. In this example, diluting a solvent mixture with a less polar solvent (hexane) from 50% to 60% reduces solvent strength, increasing compound retention and resolution (ΔCV). Also, solvent combinations of similar strength but different selectivity can also be compared. Both hexane/ethyl acetate (50:50) and hexane/dichloromethane (30:70) have solvent strength of 0.3, but ethyl acetate and dichloromethane provide different selectivity.

Stage 3: Determining the best solvent strength using TLC (cont'd)

To bring the R_f of the compound of interest into the optimal range, reduce the amount of polar solvent in the mobile phase. As an example, in **Figure 11**, the results of a solvent selectivity study show a mobile phase of 50% hexane and 50% ethyl acetate (solvent strength = 0.30), providing adequate selectivity for a crude sample (**Figure 11,** top). The R_f for the compound of interest (B) is 0.4 (2.5 CV) and the R_f of the impurity (A) is 0.55 (1.8 CV), providing a ΔCV of 0.7. With a ΔCV this low, only a small sample amount can be flash purified before overload (resolution loss, low purity fractions) occurs. By weakening the solvent strength to 60% hexane and 40% ethyl acetate (solvent strength 0.24) (**Figure 11,** middle); the R_f of compound B falls to 0.2 (5 CV) and impurity A's R_f is lowered to 0.3 (3.3 CV) with a resulting ΔCV of 1.7, enabling a potential fivefold increase in sample load on a flash cartridge (**Table 3**).

Formula:

$$\frac{(\text{Solvent A\% x solvent A strength})}{100} + \frac{(\text{Solvent B\% x solvent B strength})}{100}$$

Examples:

Hexane/ethyl acetate (50:50)
Solvent strength = (0.5 x 0.01) + (0.5 x 0.58) = 0.30

Hexane/ethyl acetate (60:40)
Solvent strength = (0.6 x 0.01) + (0.4 x 0.58) = 0.24

Hexane/dichloromethane (30:70)
Solvent strength = (0.3 x 0.01) + (0.7 x 0.42) = 0.30

If you find adequate component retention with a particular solvent mixture, you can prepare other solvent mixtures of similar strength but different selectivity for comparison (**Figure 11**, bottom).

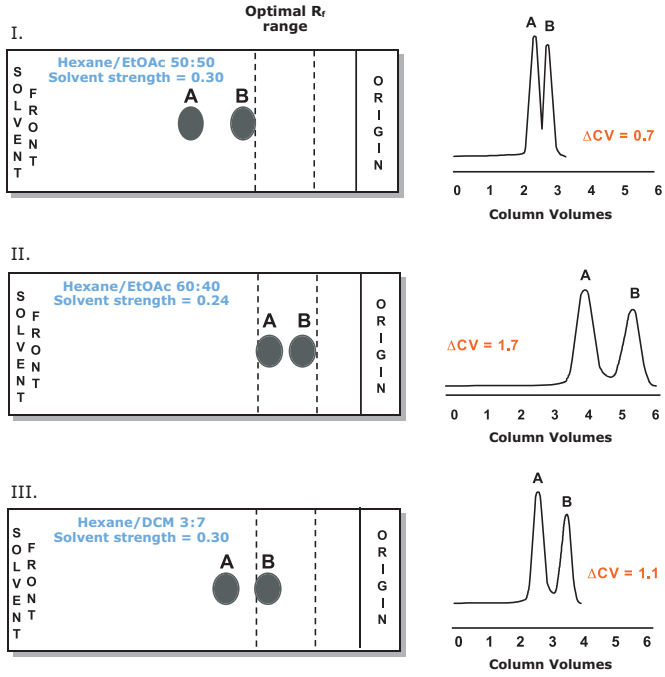


Figure 11. Examples of solvent strength on compound retention and resolution.

(I) TLC shows two sample components resolved with a 50:50 hexane/ethyl acetate solvent system (ΔCV = 0.7). Neither the component of interest (B) nor the impurity (A) has an R_f value within the optimal 0.15–0.35 range. This leads to poor flash purification.

(II) After adjusting the solvent to 60% hexane/40% ethyl acetate, the R_f values for both A and B fall into the optimal zone. Flash chromatography with these conditions shows increased compound retention and greatly improved resolution (ΔCV = 1.7).

(II) Replacing 50:50 hexane/ethyl acetate with 30:70 hexane/dichloromethane (both 0.30 solvent strength) alters both selectivity and resolution (ΔCV = 1.1).

Once a solvent system has been selected, R_f values measured, and ΔCV values calculated, use **Table 3** to select the correct cartridge for your sample size and ΔCV. The data generated from your TLC method development efforts are applicable to any sized Biotage cartridge.

Stage 4: Determining the optimum cartridge size and sample load based on TLC data

Having calculated CVs, **Table 3** may be used to help in selecting the most appropriate Biotage cartridge size.

Step 1: Look for the CV that is the closest match to your system	**Step 2**: Scan down the table based on scale of reaction	**Step 3**: Select cartridge

	Dimensions (mm)	**Column Volume**	**Flow Rate** (mL/min)	**Load**		
				ΔCV = 0.1-1.9	**ΔCV = 2.0-3.9**	**ΔCV = 4.0+**
Biotage ZIP™ 5 g	15.5 x 61	8 mL	5–20	<50 mg	50–250 mg	250–500 mg
Biotage ZIP 10 g	20 x 69	15 mL	10–20	<100 mg	100–500 mg	500–1000 mg
Biotage ZIP 30 g	27 x 116	45 mL	20–40	<300 mg	300–1500 mg	1.5–3 g
Biotage ZIP 45 g	32 x 107	60 mL	30–50	<450 mg	450–2250 mg	2.25–4.5 g
Biotage ZIP 80 g	38 x 130	102 mL	30–50	<800 mg	800–4000 mg	4–8 g
Biotage ZIP 120 g	42 x 176	170 mL	50–75	<1.2 g	1.2–6 g	6–12 g
Biotage SNAP Ultra 10 g	21 x 55	17 mL	10–50	<200 mg	200–1000 mg	1–2 g
Biotage SNAP Ultra 25 g	30 x 72	45 mL	20–100	<500 mg	500–2500 mg	2.5–5 g
Biotage SNAP Ultra 50 g	39 x 81	85 mL	30–150	<1 g	1–5 g	5–10 g
Biotage SNAP Ultra 100 g	39 x 157	164 mL	30–150	<2 g	2–10 g	10–20 g
Biotage SNAP Ultra 340 g	71 x 168	582 mL	65–325	<6.8 g	6.8–34g	34–68 g
Biotage SNAP 10 g	21 x 55	15 mL	10–20	<100 mg	100–500 mg	500–1000 mg
Biotage SNAP 25 g	30 x 72	33 mL	20–40	<250 mg	250–750 mg	750–2500 mg
Biotage SNAP 50 g	39 x 81	66 mL	30–50	<500 mg	500–2500 mg	2.5–5 g
Biotage SNAP 100 g	39 x 157	132 mL	30–50	<1.0 g	1–5 g	5–10 g
Biotage SNAP 340 g	71 x 168	470 mL	65–100	<3.4 g	3.4–17 g	17–34 g
Biotage SNAP 750 g	82 x 291	990 mL	100–300	<7.5 g	7.5–40 g	40–75 g
Biotage SNAP 1500 g	107 x 328	1980 mL	300–500	<15.0 g	15–80 g	80–150 g
Flash 75S	75 x 90	300 mL	100–250	<2.0 g	2–10 g	10–20 g
Flash 75M	75 x 150	500 mL	100–250	<4.0 g	4–20 g	10–40 g
Flash 75L	75 x 300	1000 mL	100–250	<8.0 g	8–40 g	40–80 g
Flash 150M	150 x 300	4.3 L	500–1000	<25.0 g	25–125 g	125–250 g
Flash 150L	150 x 600	8.6 L	500–1000	<50.0 g	50–250 g	250–500 g
Flash 400M	400 x 300	28 L	7000	<200 g	0.2–1.0 kg	1–2 kg
Flash 400L	400 x 600	56 L	7000	<400 g	0.4–2.0 kg	2–4 kg

Table 3. Gradient loading table

Ordering Information — see page 24–27

Normal-phase Gradients

Gradient elution enables chemists to speed purification, improve recovery and yield, and even increase fraction purity. Gradients are slightly different to Isocratic elution modes since the stronger eluting solvent concentration is increased over time relative to the weaker solvent, increasing the solubility of more highly retained compounds. This causes compounds to elute sooner and in tighter bands compared to isocratic systems. As solvent strength increases during the purification, the classic isocratic $CV=1/R_f$ relationship is not applicable. In a gradient, compounds elute with fewer column volumes than predicted by the isocratic equation. The exact number of elution CV depends on the gradient slope.

Biotage has developed an algorithm to help chemists transfer TLC R_fs to gradient CVs. This algorithm is incorporated all Biotage Isolera and Isolera LS instrumentation. Using these conditions, a compound with an R_f of 0.4 elutes near the middle of the purification and is separated from other compounds within the R_f range of 0.1 to 0.9 (see **Table 3**).

TLC-to-gradient

To convert TLC data into a gradient elution method uses the same optimization tools as previously discussed.

After determining the best selectivity and best solvent strength you can use the patented Biotage algorithm to create the best gradient. If you use a Biotage Isolera™ or SP system, the instrument will do this for you.

First **Determine the R_f values for the compound of interest**

Second **Determine the R_f value for the compound preceding the compound of interest**

Third **Determine the R_f value for the compound eluting just after the compound of interest**

Then, convert all R_f values to CV using the equation $CV=1/R_f$. Whichever pair has the lowest ΔCV dictates sample load.

The algorithm has three steps for the three gradient segments:

1. **Use 1/4 of the strong solvent % used with the TLC run, hold for 1 CV**
2. **Create a linear segment from the step 1 % to 2x the % used with the TLC run over 10 CV**
3. **Hold this % for 2 CV**

Then, using **Table 3**, locate the ΔCV from your calculation above and the cartridge you plan on using and the result will be the recommended sample load.

Scale-up

Scaling up flash purification methods is easy and straight forward. Any method developed on a Biotage flash cartridge can be scaled-up to a larger cartridge simply by referring to **Table 4** in the following page.

Developing Reversed-phase Methods

Stage 1: Converting HPLC (high-performance liquid chromatography) **retention times and gradient methods to CV**

As a technique used for purification of water-soluble compounds, reversed-phase flash purification method development is different to normal-phase. The recommended approach for reversed-phase includes developing and optimizing methods using HPLC and a Biotage KP-C18-HS scaling column (4.6 x 250 mm). The scaling column is packed with the identical C18 phase as the Biotage KP-C18-HS flash cartridges. Begin by creating a gradient on the HPLC from 10–90% acetonitrile (or methanol) in water at 3 mL/min (1 CV/min) with this gradient. A recommended starting point is:

Segment 1: 10% ACN (or MeOH) for 1 min

Segment 2: 10-90% ACN (MeOH) over 10 min

Segment 3: Hold 90% ACN for 2 min

Continue to modify this until the compound of interest is fully separated from its impurities and has a retention time of at least five minutes. On the HPLC, optimal load can be determined by increasing the sample amount until resolution has been lost. To transfer the HPLC method to flash, convert compound retention time (Tr) to column volume using the following equation:

Compound CV = compound Tr/To, where
To = the void time (about 1 min at 3 mL/min)

Use the same formula to convert the gradient program from time to CV:

Gradient segment length (time)/
To = flash segment length (CV)

By using these formulas and the same solvents, reproducible reversed-phase flash gradients can be developed. In many cases flash methods can be developed from HPLC style methods using scaling columns. Some caution must be noted when transferring methods from commercial HPLC columns (typically 3–5 micron silica) to flash (typically 40–60 micron silica).

Stage 2: Determining the optimum cartridge size and sample load based on TLC data

Flash scale-up is based on consolidating the solvent's linear velocity and sample load in cartridges of different sizes/volumes. Small scale flash purification is easily scaled with scale-up factors based, which take into account the cartridge differences.

Scaling up a method performed on a Biotage scaling column or flash cartridge is easily accomplished by using **Table 4** below.

Locate the column or cartridge used for method development (Left column) and then locate the scale factor required. Read up that column to determine which cartridge is needed.

Step 1:
Find your current flash cartridge in the left column

Step 2:
Read across the row to obtain the scale-up factor for your larger sample

Step 3:
Read up to find the appropriate Biotage flash cartridge for that scale factor

Example: A 1-gram purification on 25 g Biotage SNAP requires scale-up to 30 g, the appropriate scale-up cartridge, according to the table below, is a Biotage SNAP XL (750 g cartridge).

Media Mass	4.6 x 250	5 g	10 g	25 g	30 g	45 g	50 g	80 g	100 g	120 g	200 g	340 g	400 g	750 g	800 g	1.5 kg	2.5 kg	5 kg	20 kg	40 kg
4.6 x 250	1	2	4	10	12	18	20	32	40	48	80	136	160	300	320	600	1000	2000	8000	16000
5 g		1	2	5	6	9	10	16	20	24	40	68	80	150	160	300	500	1000	4000	8000
10 g			1	2.5	3	4.5	5	8	10	12	20	34	40	75	80	150	250	500	2000	4000
25 g				1	1.2	1.8	2	3	4	5	8	14	16	**30**	32	60	100	200	800	1600
30 g					1	1.5	2	3	3.5	4	7	12	14	25	27	50	83	167	667	1333
45 g						1	1.1	1.8	2.2	3	4.5	7.5	9	17	18	33	56	111	444	888
50 g							1	1.6	2	2.4	4	6.8	8	15	16	30	50	100	400	800
80 g								1	1.25	1.5	2.5	4.3	5	9.5	10	19	31	62	250	500
100 g									1	1.2	2	3.4	4	7.5	8	15	25	50	200	400
120 g										1	1.7	2.8	3.5	6.5	7	12	21	42	167	333
200 g											1	1.7	2	3.8	4	7.5	13	25	100	200
340 g												1	1.2	2.2	2.4	4.4	7.4	15	60	120
400 g													1	1.9	2	3.8	6.3	13	50	100
750 g														1	1.1	2	3.5	7	27	54
800 g															1	1.9	3.1	6.2	25	50
1.5 kg																1	1.7	3.3	13.5	27
2.5 kg																	1	2	8	16
5 kg																		1	4	8
20 kg																			1	2
40 kg																				1

Table 4. Scale-up table for use with flash cartridges

Ordering Information — see page 24–27

Ordering Information

Biotage® SNAP Cartridges

Product	Part Number
Biotage KP-Sil	
10 g, 20/case	FSK0-1107-0010
25 g, 20/case	FSK0-1107-0025
50 g, 20/case	FSK0-1107-0050
100 g, 20/case	FSK0-1107-0100
340 g, 6/case	FSK0-1107-0340
750 g, 2/case	FSK0-1107-0750
1500 g, 2/case	FSK0-1107-1500
Biotage HP-SIL	
10 g, 20/case	FSHP-1207-0010
25 g, 20/case	FSHP-1207-0025
50 g, 20/case	FSHP-1207-0050
100 g, 20/case	FSHP-1207-0100
340 g, 6/case	FSHP-1207-0340
Biotage KP-C18-HS	
12 g, 2/case	FSL0-1118-0012
30 g, 2/case	FSL0-1118-0030
60 g, 2/case	FSL0-1118-0060
120 g, 2/case	FSL0-1118-0120
400 g, 1/case	FSL0-1118-0400
950 g, 1/case	FSL0-1118-0950
1800 g, 1/case	FSL0-1118-1800
Biotage KP-NH	
11 g, 10/case	FSN0-0909-0011
28 g, 10/case	FSN0-0909-0028
55 g, 10/case	FSN0-0909-0055
110 g, 10/case	FSN0-0909-0110
375 g, 1/case	FSN0-0909-0375
900 g, 1/case	FSN0-0909-0900
1800 g, 1/case	FSN0-0909-1800

Biotage SNAP Ultra Cartridges

Product	Part Number
10 g, 20/case	FSUL-0442-0010
25 g, 20/case	FSUL-0442-0025
50 g, 20/case	FSUL-0442-0050
100 g, 20/case	FSUL-0442-0100
340 g, 6/case	FSUL-0442-0340

Biotage SNAP XL Cartridges

Product	Part Number
Biotage KP-Sil	
SNAP 750 g, 2/case	FSK0-1107-0750
SNAP 1500 g, 2/case	FSK0-1107-1500
Biotage KP-C18-HS	
SNAP 950 g, 1/case	FSL0-1118-0950
SNAP 1850 g, 1/case	FSL0-1118-1850
Biotage KP-NH	
SNAP 900 g, 1/case	FSN0-0909-0900
SNAP 1800 g, 1/case	FSN0-0909-1800

Biotage ZIP™ Cartridges

Product	Part Number
5 g, 20/case	440-0500-DZ-20
10 g, 20/case	440-1000-EZ-20
30 g, 20/case	440-3000-FZ-20
45 g, 20/case	440-4500-SZ-20
80 g, 20/case	440-8000-JZ-20
120 g, 20/case	440-120G-UZ-20

FLASH+® Cartridges

Product	Part Number
Biotage KP-Sil	
FLASH 12+S, 12 x 75 mm, 20/case	FPK0-1107-15026
FLASH 12+M, 12 x 150 mm, 20/case	FPK0-1107-15046
FLASH 25+S, 25 x 75 mm, 20/case	FPK0-1107-16026
FLASH 25+M, 25 x 150 mm, 20/case	FPK0-1107-16046
FLASH 40+S, 40 x 75 mm, 20/case	FPK0-1107-17026
FLASH 40+M, 40 x 150 mm, 20/case	FPK0-1107-17046
Biotage KP-C18-HS	
FLASH 12+S, 12 x 75 mm, 2/case	FPL0-1118-15025
FLASH 12+M, 12 x 150 mm, 2/case	FPL0-1118-15045
FLASH 25+S, 25 x 75 mm, 2/case	FPL0-1118-16025
FLASH 25+M, 25 x 150 mm, 2/case	FPL0-1118-16045
FLASH 40+S, 40 x 75 mm, 2/case	FPL0-1118-15025
FLASH 40+M, 40 x 150 mm, 1/case	FPL0-1118-17020
Biotage KP-NH	
FLASH 12+S, 12 x 75 mm, 20/case	FPNH-12S
FLASH 12+M, 12 x 150 mm, 20/case	FPNH-12M
FLASH 25+S, 25 x 75 mm, 10/case	FPNH-25S
FLASH 25+M, 25 x 150 mm, 10/case	FPNH-25M
FLASH 40+S, 40 x 75 mm, 5/case	FPNH-40S
FLASH 40+M, 40 x 150 mm, 5/case	FPNH-40M

Biotage SNAP Samplet® Cartridges

Product	Part Number
Biotage KP-Sil	
1 g, 20/case	SAS-1107-0010
3 g, 20/case	SAS-1107-0025
10 g, 20/case	SAS-1107-0100
34 g, 6/case	SAS-1107-0340
Biotage HP-SIL	
1 g, 20/case	SAS-1207-0010
3 g, 20/case	SAS-1207-0025
10 g, 20/case	SAS-1207-0100
34 g, 6/case	SAS-1207-0340
Biotage KP-C18-HS	
1 g, 20/case	SAS-1118-0012
3 g, 20/case	SAS-1118-0030
12 g, 20/case	SAS-1118-0120
40 g, 6/case	SAS-1118-0400
Biotage KP-NH	
1 g, 20/case	SAS-0909-0011
3 g, 20/case	SAS-0909-0028
10 g, 20/case	SAS-0909-0110
37 g, 6/case	SAS-0909-0375

Biotage SNAP Ultra Samplet Cartridges

Product	Part Number
1 g, 20/case	SAS-0442-0010
3 g, 20/case	SAS-0442-0025
10 g, 20/case	SAS-0442-0100
34 g, 6/case	SAS-0442-0340

FLASH+ Samplet Cartridges

Product	Part Number
Biotage KP-Sil	
FLASH 12+, 48/case	SAM-1107-1421J
FLASH 25+, 20/case	SAM-1107-16016
FLASH 40+, 20/case	SAM-1107-17016
Biotage KP-C18-HS	
FLASH 12+, 48/case	SAM-1118-1421J
FLASH 25+, 20/case	SAM-1118-16016
FLASH 40+, 20/case	SAM-1118-17016
Biotage KP-NH	
FLASH 12+, 48/case	SAM-NH12
FLASH 25+, 20/case	SAM-NH25
FLASH 40+, 20/case	SAM-NH40

ISOLUTE® Flash Cartridges

Product	Part Number
ISOLUTE Flash Silica II	
2 g Silica II, 25 mL cartridges, 20/case	440-0200-D
5 g Silica II, 25 mL cartridges, 20/case	440-0500-E
10 g Silica II, 70 mL cartridges, 16/case	440-1000-F
20 g Silica II, 70 mL cartridges, 16/case	440-2000-F
25 g Silica II, 150 mL cartridges, 8/case	440-2500-J
50 g Silica II, 150 mL cartridges, 8/case	440-5000-J
70 g Silica II, 150 mL cartridges, 8/case	440-7000-J
ISOLUTE Flash C18	
2 g C18, 15 mL cartridges, 20/case	451-0200-D
5 g C18, 25 mL cartridges, 20/case	451-0500-E
10 g C18, 70 mL cartridges, 16/case	451-1000-F
20 g C18, 70 mL cartridges, 16/case	451-2000-F
25 g C18, 150 mL cartridges, 8/case	451-2500-J
50 g C18, 150 mL cartridges, 8/case	451-5000-J
70 g C18, 150 mL cartridges, 8/case	451-7000-J
ISOLUTE Flash NH	
2 g NH, 15 mL cartridges, 20/case	454-0200-D
5 g NH, 25 mL cartridges, 20/case	454-0500-E
10 g NH, 70 mL cartridges, 16/case	454-1000-F
20 g NH, 70 mL cartridges, 16/case	454-2000-F
25 g NH, 150 mL cartridges, 8/case	454-2500-J
50 g NH, 150 mL cartridges, 8/case	454-5000-J
70 g NH, 150 mL cartridges, 8/case	454-7000-J
ISOLUTE Flash SCX-2	
2 g SCX-2, 15 mL cartridges, 20/case	456-0200-D
5 g SCX-2, 25 mL cartridges, 20/case	456-0500-E
10 g SCX-2, 70 mL cartridges, 16/case	456-1000-F
20 g SCX-2, 70 mL cartridges, 16/case	456-2000-F
25 g SCX-2, 150 mL cartridges, 8/case	456-2500-J
50 g SCX-2, 150 mL cartridges, 8/case	456-5000-J
70 g SCX-2, 150 mL cartridges, 8/case	456-7000-J

Dry Loading Vessels (DLV)

Product	Part Number
Dry load vessel kit for external sample loading, 1–30 g capacity	DLV-030
Dry load vessel kit for external sample loading, 10–70 g capacity	DLV-070
Dry load vessel kit with holder, 1 empty cartridge and frit, 50–500 g capacity	DLV-500
Replacement DLVs and frits for DLV-030, 20/case	DLV-035
Replacement DLVs and frits for DLV-070, 20/case	DLV-075
Replacement DLVs and frits for DLV-500, 4/case	DLV-505

Ordering Information (cont'd)

Flash 75/Flash 150 Cartridges

Product	Part Number
Biotage® KP-Sil	
Flash 75S, 200 g, 75 x 90 mm, 2/case	FK0-1107-19165
Flash 75M, 400 g, 75 x 150 mm, 2/case	FK0-1107-19045
Flash 75L, 800 g, 75 x 300 mm, 2/case	FK0-1107-19075
Flash 75S (Jumbo), 200 g, 75 x 190 mm, 10/case	FK0-1107-19163
Flash 75M (Jumbo), 400 g, 75 x 150 mm, 10/case	FK0-1107-19043
Flash 75L (Jumbo), 800 g, 75 x 300 mm, 10/case	FK0-1107-19073
Flash 150M, 2500 g, 150 x 300 mm, 2/case	FK0-1107-25075
Flash 150L, 5000 g, 150 x 600 mm, 2/case	FK0-1107-25155
Biotage KP-C18-HS	
Flash 75S, 250 g, 75 x 90 mm, 1/case	FL0-1118-19160
Flash 75M, 480 g, 75 x 150 mm, 1/case	FL0-1118-19040
Flash 75L, 960 g, 75 x 300 mm, 1/case	FL0-1118-19070
Flash 150M, 3000 g, 150 x 300 mm, 1/case	FL0-1118-25070
Flash 150L, 6000 g, 150 x 600 mm, 1/case	FL0-1118-25150
Biotage KP-NH	
Flash 75S, 225 g, 75 x 90 mm, 1/case	FPNH-75S
Flash 75M, 440 g, 75 x 150 mm, 1/case	FPNH-75M
Flash 75L, 880 g, 75 x 300 mm, 1/case	FPNH-75L
Flash 150M, 2750 g, 150 x 300 mm, 1/case	FPNH-150M
Flash 150L, 5500 g, 150 x 600 mm, 1/case	FPNH-150L
Diaion® HP20	
Flash 75S, 75 x 90 mm, 2/case	FT6-2030-19165
Flash 75M, 75 x 150 mm, 2/case	FT6-2030-19045
Flash 75L, 75 x 300 mm, 2/case	FT6-2030-19075
Flash 75S (Jumbo), 75 x 190 mm, 10/case	FT6-2030-19163
Flash 75M (Jumbo), 75 x 150 mm, 10/case	FT6-2030-19043
Flash 75L (Jumbo), 75 x 300 mm, 10/case	FT6-2030-19073
Flash 150M, 150 x 300 mm, 2/case	FT6-2030-25075
Flash 150L, 150 x 600 mm, 2/case	FT6-2030-25155
Diaion HP20SS	
Flash 75S, 270 g, 75 x 90 mm, 1/case	FT6-2530-19160
Flash 75M, 450 g, 75 x 150 mm, 1/case	FT6-2530-19040
Flash 75L, 900 g, 75 x 300 mm, 1/case	FT6-2530-19070
Flash 150M, 3600 g, 150 x 300 mm, 1/case	FT6-2530-25070
Flash 150L, 7200 g, 150 x 600 mm, 1/case	FT6-2530-25150

Flash 400 Cartridges

Product	Part Number
Biotage KP-Sil	
Flash 400M, 20 kg, 2/case	FK0-1107-50075
Flash 400L, 40 kg, 2/case	FK0-1107-50155
Biotage KP-C18-HS	
Flash 400M, 24 kg, 1/case	FL0-1118-50070
Flash 400L, 48 kg, 1/case	FL0-1118-50150
Flash-WAC	
Flash 400M, 13 kg, 2/case	C1YR-4021-50075
Flash 400L, 26 kg, 2/case	C1YR-4021-50155

Accessories

Product	Part Number
Thin-Layer Chromatography (TLC)	
Biotage KP-NH TLC plate, 5 x 10 cm, 50/box	TLC-KPNH-0510-FI
Biotage KP-Sil TLC plate, 5 x 10 cm, glass, 50/box	TLC-0510-FI
Biotage KP-Sil TLC plate, 10 x 10 cm, glass, 25/box	TLC-1010-FI
Biotage KP-Sil TLC plate, 2.5 x 7.5 cm, glass, 100/box	TLC-2575-FI
Liquid Sample Injection Valve and Adapters	
Adapter to attach a Biotage 3-way injection valve to a Biotage SNAP cartridge	411081
Cartridge Adapters	
Biotage SNAP to Biotage FlashMaster II and PersonalPlus adapter	411069
Biotage SNAP 10 g cartridge adapter ring and connecting tubing for SP systems	410792
Biotage SNAP 25 g cartridge adapter ring and connecting tubing for SP systems	411824
Biotage SNAP 50 g/100 g cartridge adapter ring and connecting tubing for SP systems	410797
Biotage SNAP 340g cartridge adapter kit for non-Biotage SP systems	410805
Female Luer inlet fitting for SNAP 750 g and 1500 g cartridges, 1/pk	412358
Male Luer outlet fitting for SNAP 750 g and 1500 g cartridges, 1/pk	412537
Luer lock to Luer tip adapter	120-1110
Samplet® Accessories	
Empty Samplet kit for Biotage SNAP	
1 g Samplet, 20/case	SES-0010
3 g Samplet, 20/case	SES-0025
10 g Samplet, 20/case	SES-0100
34 g Samplet, 6/case	SES-0340
Dry load frits for	
10 g Biotage SNAP cartridges, 20/case	SLF-0010
25 g Biotage SNAP cartridges, 20/case	SLF-0025
100 g Biotage SNAP cartridges, 20/case	SLF-0100
340 g Biotage SNAP cartridges, 6/case	SLF-0340
Frit insertion tool for	
1 g empty Biotage SNAP Samplet cartridges	SFS-0010
3 g empty Biotage SNAP Samplet cartridges	SFS-0025
10 g empty Biotage SNAP Samplet cartridges	SFS-0100
34 g empty Biotage SNAP Samplet cartridges	SFS-0340

Product	Part Number
ISOLUTE® FlashPack Plunger Assemblies	
Plunger for 6 mL cartridges	00-012-000
Plunger for 15 mL cartridges	00-016-000
Plunger for 25 mL cartridges	00-020-000
Plunger for 70 mL cartridges	00-027-000
Plunger for 150 mL cartridges	00-037-000
Cartridge Holders	
Cartridge holder for Biotage Isolera systems	
Biotage SNAP 10 g cartridge	411922
Biotage SNAP 25 g cartridge	411776
Biotage SNAP 50 g and 100 g cartridge	411923
Biotage SNAP 340 g cartridge	411924
Biotage ZIP 5 g and 10 g cartridge	413902
Biotage ZIP 30 g cartridge	413302
Biotage ZIP 45 g cartridge	413303
Biotage ZP 80 g cartridge	413304
Biotage ZP 120 g cartridge	413305
DLV-030 and -070 holder for use with Biotage SNAP 10–100 g cartridges, 1/pk	413127
DLV-030 and -070 holder for use with Biotage SNAP 340 g cartridges, 1/pk	413128
Biotage SNAP 340g cartridge holder for SP systems, 1/pk	410800
Biotage SNAP 750 g and 1500 g cartridge holder for Biotage Isolera systems, 1/pk	412422
Scaling Column	
Biotage KP-C18-HS 4.6 x 250 mm HPLC column	S1L0-1118-93050
Biotage SIMs (Sample Injection Module)	
Stainless steel Biotage SIM for Flash 75, 100 mL	SIM-0102
Stainless steel Biotage SIM for Flash 75, 500 mL	SIM-0502
Stainless steel Biotage SIM for Flash 150, 1000 mL	SIM-1002
Stainless steel Biotage SIM for Flash 150, 2000 mL	SIM-2002

Tools for Discovery and Development Chemistry

Discovery Chemistry
- Flash purification
- Microwave synthesis
- Work-up and sample preparation
- Evaporation
- 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

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