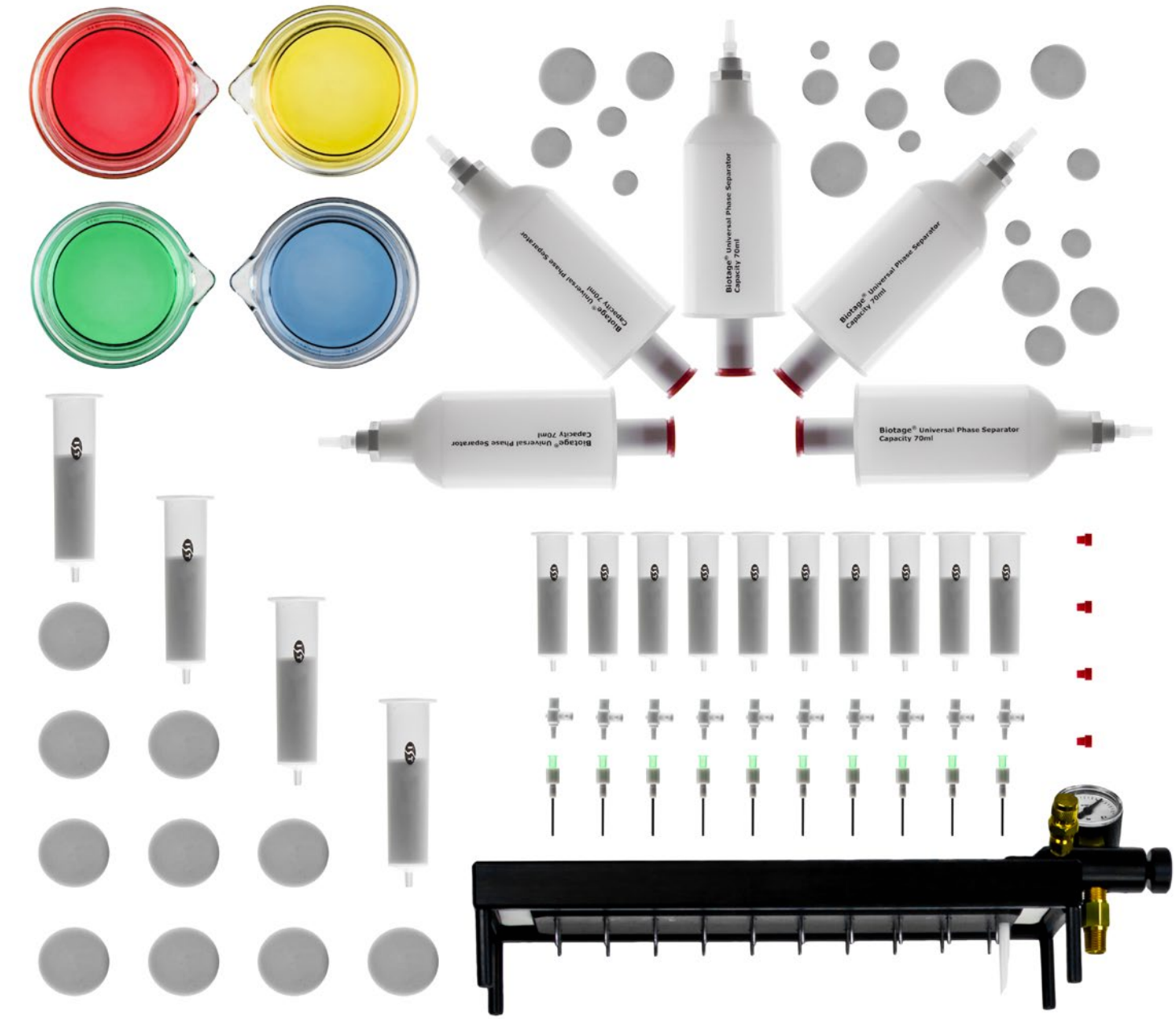
Work-up Products

Filtration | Catch & Release | Phase Separation | Dry Loading | Metal Scavenging



Biotage

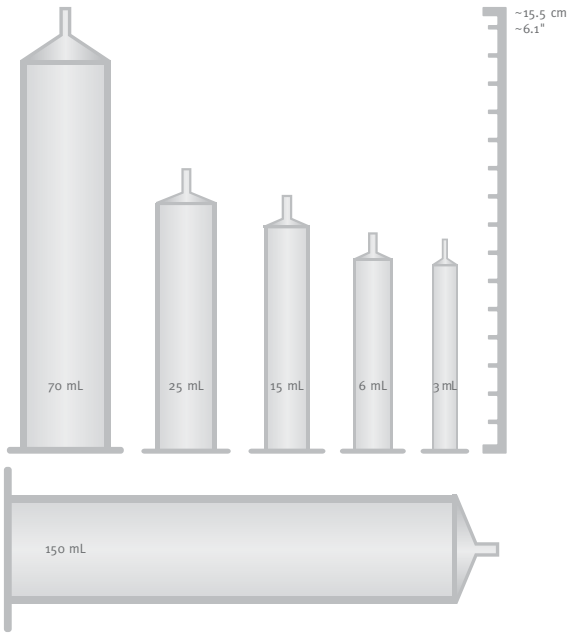
Contents

Work-up Products

Biotage offers a range of products for reaction mixture work-up and preparation of organic extracts. The solutions include a range of techniques and also address throughput requirements from filtration, catch & release, and scavenging cartridges in organic synthesis workflows.

Techniques

- Catch & release
- Scavenging
- Separation of immiscible organic/aqueous phases
- Water removal
- Filtration



Product Application Selection Guide

Technique Name	Application Details	Recommended Product
Excess reagent scavenging	**Remove excess basic reagent**	ISOLUTE® SCX-2 (Silica-bound sulfonic acid)
	Remove excess acidic reagent	ISOLUTE® PE-AX (Silica-bound quaternary amine)
Catch & release	**Purify and isolate basic target compound**	ISOLUTE® SCX-2 (Silica-bound sulfonic acid)
	Purify and isolate acidic target compound	ISOLUTE® PE-AX (Silica-bound quaternary amine)
Liquid-liquid extraction	**LLE for aqueous work-up modern day convenient separation funnels**	• ISOLUTE® Phase Separators (water on top) • Universal Phase Separators (water on bottom)
Plug chromatography/ clean-up cartridges	**Simple cleanup of polar compounds**	• ISOLUTE® Silica • ISOLUTE® Alumina
Filtration	**Particulate removal "Tar" removal, insoluble catalyst filtration**	ISOLUTE® filtration cartridges and plates Celite*
Aqueous and organic/ aqueous prep-LC fraction concentration	**Fraction concentration / remove mobile phase from hplc fractions**	• ISOLUTE® 103 (traps organic compounds in fraction) • ISOLUTE® SCX-2 (traps cationic compounds in fraction)
Dry Loading for Flash Purification	**Sample loading, especially for limited solubility samples for purification**	• Celite* • ISOLUTE® HM-N • Bulk silica
Sample drying	**Remove water from organic samples/extracts**	Sodium sulphate cartridges
Metal scavenging	**Remove trace metals (Pd, Ru, Sn, Pb etc.) from products**	Biotage metal scavengers

*Celite is a trademark owned by Johns-Manville Corporation.

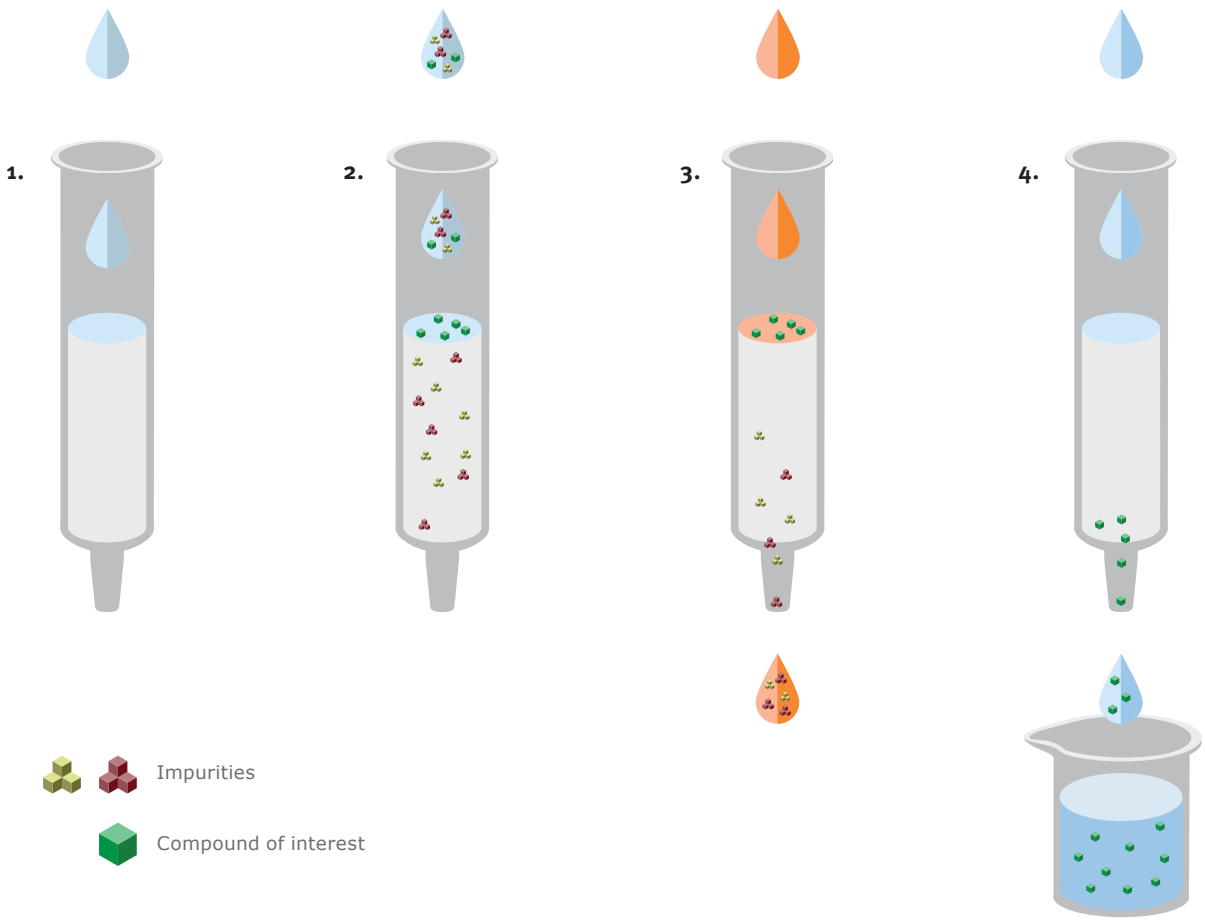
Catch & Release

During catch & release the media bed “catches” the compound of interest. Rinsing the cartridge with solvent removes impurities, leaving the compound of interest on the cartridge for subsequent elution by an appropriate solvent. Biotage has a range of cartridges depending on whether the product to be recovered is acidic, basic or neutral. Applications include: purification, solvent switch, concentrating & capturing and HPLC fractions.

Overall Process

1. Cartridge equilibration (can be optional)
2. Sample loading
3. Cartridge washing (impurity elution, product is retained)
4. Product elution

It may also be possible to retain impurities in step 3, such that the cartridge becomes a one pass, one step purification system.



ISOLUTE® SCX-2

Catch & Release and Scavenging of Basic Compounds

Base Material: Silica, 50 µm
Functional Group: Propylsulfonic acid
Capacity: 0.6 mmol/g
Counter Ion: Proton

ISOLUTE® SCX-2 is a silica-based media with a chemically bonded propylsulfonic acid functional group. It is used for the isolation of a wide range of basic compounds using both catch & release and scavenging protocols. ISOLUTE SCX-2 is available packed into SPE cartridges for flow-through. Using the catch & release approach, basic target compounds can be isolated from a range of reaction mixtures. ISOLUTE SCX-2 cartridges can be used to remove excess basic reagents, allowing neutral or acidic compounds to pass straight through to the collection vessel.

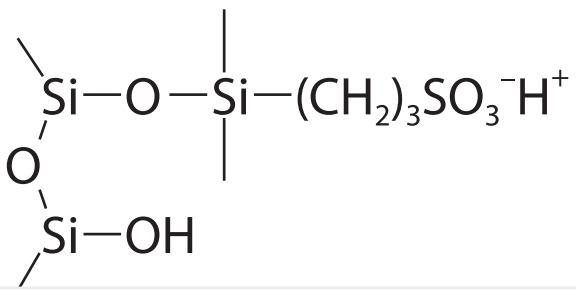


Figure 4. Chemical structure of SCX-2.

Typical Procedure

1. Equilibration: Pipette 10 mL of DCM, MeOH or THF into cartridge and allow to drain.
2. Loading: Pipette approximately 1 mL of sample standard onto the top of the column and allow to flow under gravity onto the column until the sample falls below the top frit surface. Wash column with one volume of DCM. Note: Elution will contain neutral component.
3. Elution: Elute compound with 10 mL of 2M ammonia solution, and wash with additional equilibration solvent if desired, collecting released sample in appropriate container. Note: Elution will contain basic component.

Further Notes: equilibration, loading and elution solvents may be substituted. Base cartridge loading calculations on approx. 60% cartridge capacity for initial run, depending on the product, loading may be increased further following optimization.

Ordering Information

Description	Part Number	Quantity
ISOLUTE® SCX-2 Cartridges		
ISOLUTE SCX-2 500 mg/3 mL	532-0050-B	50
ISOLUTE SCX-2 1 g/3 mL	532-0100-B	50
ISOLUTE SCX-2 500 mg/6 mL	532-0050-C	30
ISOLUTE SCX-2 1 g/6 mL	532-0100-C	30
ISOLUTE SCX-2 2 g/15 mL	456-0200-D	20
ISOLUTE SCX-2 5 g/25 mL	456-0500-E	20
ISOLUTE SCX-2 10 g/70 mL	456-1000-F	16
ISOLUTE SCX-2 20 g/70 mL	456-2000-F	16
ISOLUTE SCX-2 50 g/150 mL	456-5000-J	8
ISOLUTE SCX-2 70 g/150 mL	456-7000-J	8
ISOLUTE® Tabless Cartridges for High Throughput Work-up		
ISOLUTE SCX-2 500 mg/3 mL, tabless	532-0050-BG	50
ISOLUTE SCX-2 1 g/3 mL, tabless	532-0100-BG	50
ISOLUTE SCX-2 500 mg/6 mL, tabless	532-0050-CG	30
ISOLUTE SCX-2 1 g/6 mL, tabless	532-0100-CG	30

ISOLUTE® PE-AX

Catch & Release and Scavenging of Acidic Compounds

Base Material: Silica, 50 µm
Solid-Support Type: Silica
Functional Group: Quaternary Amine
Capacity: 0.6 mmol/g
Counter Ion: Acetate

ISOLUTE® PE-AX is a silica-based sorbent with a chemically bonded quaternary amine functional group. It is used for the isolation of a wide range of acidic compounds using both catch & release and scavenging protocols. ISOLUTE PE-AX is available packed into SPE cartridges for flow-through. Using the catch & release approach, acidic target compounds can be isolated from a range of reaction mixtures. ISOLUTE PE-AX cartridges can be used in a scavenging mode to remove excess acidic reagents, allowing neutral or basic compounds to pass straight through to the collection vessel.

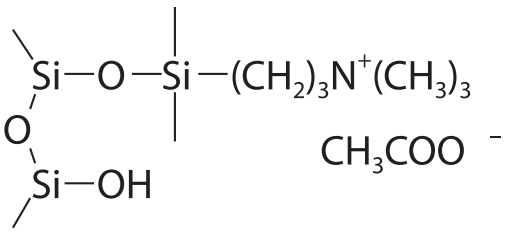


Figure 1. Chemical structure of ISOLUTE® PE-AX.

Typical Procedure

1. Equilibration: Pipette 10 mL of DCM, MeOH or THF into cartridge and allow to drain.
2. Loading: Pipette approximately 1 mL of sample standard onto the top of the column and allow to flow under gravity onto the column until the sample falls below the top frit surface. Wash column with one volume of DCM. Note: Elution will contain neutral component.
3. Elution: Elute compound with 1M HCl solution, and wash with additional equilibration solvent if desired, collecting released sample in appropriate container. Note: Elution will contain acidic component.

Further Notes: equilibration, loading and elution solvents may be substituted. Base cartridge loading calculations on approx. 60% cartridge capacity for initial run, depending on the product, loading may be increased further following optimization.

Ordering Information

Description	Part Number	Quantity
ISOLUTE® Cartridges		
ISOLUTE PE-AX 500 mg/3 mL	503-0050-B	50
ISOLUTE PE-AX 1 g/3 mL	503-0100-B	50
ISOLUTE PE-AX 500 mg/6 mL	503-0050-C	30
ISOLUTE PE-AX 1 g/6 mL	503-0100-C	30
ISOLUTE PE-AX 2 g/15 mL	503-0200-D	20
ISOLUTE PE-AX 5 g/25 mL	503-0500-E	20
ISOLUTE PE-AX 10 g/70 mL	503-1000-F	16
ISOLUTE PE-AX 20 g/70 mL	503-2000-F	16
ISOLUTE® Tabless Cartridges for High Throughput Work-up		
ISOLUTE PE-AX 500 mg/3 mL, tabless	503-0050-BG	50
ISOLUTE PE-AX 1 g/3 mL, tabless	503-0100-BG	50
ISOLUTE PE-AX 500 mg/6 mL, tabless	503-0050-CG	30
ISOLUTE PE-AX 1 g/6 mL, tabless	503-0100-CG	30

ISOLUTE® PE-AX/SCX-2

Simultaneous Scavenging of Basic and Acidic Compounds

Quaternary Amine
Base Material: Silica, 50 µm
Functional Group: Quaternary Amine
Capacity: 0.6 mmol/g
Counter Ion: Acetate

Propylsulfonic Acid
Base Material: Silica, 50 µm
Functional Group: Propylsulfonic acid
Capacity: 0.5 mmol/g
Counter Ion: Proton

ISOLUTE® PE-AX/SCX-2 is a silica-based media with chemically bonded propylsulfonic acid and quaternary amine functional groups. It is used for the isolation of a wide range of neutral compounds. ISOLUTE PE-AX/SCX-2 is available packed into SPE cartridges flow-through.

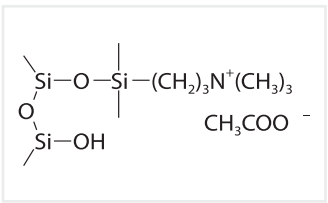


Figure 2. Chemical structure of PE-AX.

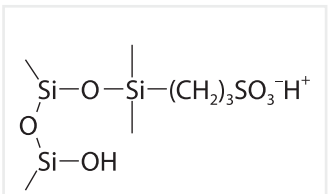
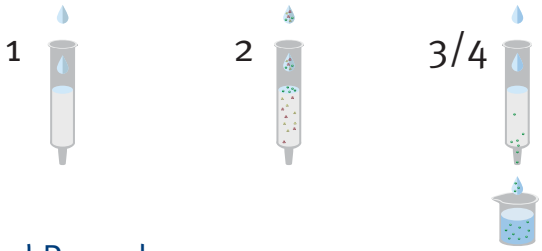


Figure 3. Chemical structure of SCX-2.



Typical Procedure

1. Equilibration: Pipette 10mL of DCM, MeOH or THF into cartridge and allow to drain.
2. Loading: Pipette approximately 1 mL of sample standard onto the top of the column and allow to flow under gravity onto the column until the sample falls below the top frit surface. Wash column with one volume of DCM. Note: Elution will contain neutral component.
3. Acidic Compound Elution (Step 1): Elute compound with 1M HCl solution, and wash with additional equilibration solvent if desired, collecting released sample in appropriate container. Note: Elution will contain acidic component.
4. Basic Compound Elution (Step 2): Elute compound with 10 mL of 2M ammonia solution, and wash with additional equilibration solvent if desired, collecting released sample in appropriate container. Note: Elution will contain basic component.

Further Notes: equilibration, loading and elution solvents may be substituted. Base cartridge loading calculations on approx. 60% cartridge capacity for initial run, depending on the product, loading may be increased further following optimization.

Ordering Information

Description	Part Number	Quantity
ISOLUTE® Cartridges		
ISOLUTE PE-AX/SCX-2 500 mg/3 mL	988-0050-B	50
ISOLUTE PE-AX/SCX-2 1 g/3 mL	988-0100-B	50
ISOLUTE PE-AX/SCX-2 500 mg/6 mL	988-0050-C	30
ISOLUTE PE-AX/SCX-2 1 g/6 mL	988-0100-C	30
ISOLUTE PE-AX/SCX-2 2 g/15 mL	988-0200-D	20
ISOLUTE PE-AX/SCX-2 5 g/25 mL	988-0500-E	20
ISOLUTE PE-AX/SCX-2 10 g/70 mL	988-1000-F	16
ISOLUTE PE-AX/SCX-2 20 g/70 mL	988-2000-F	16
ISOLUTE® Tabless Cartridges for High Throughput Work-up		
ISOLUTE PE-AX/SCX-2 500 mg/3 mL, tabless	988-0050-BG	50
ISOLUTE PE-AX/SCX-2 1 g/3 mL, tabless	988-0100-BG	50
ISOLUTE PE-AX/SCX-2 500 mg/6 mL, tabless	988-0050-CG	30
ISOLUTE PE-AX/SCX-2 1 g/6 mL, tabless	988-0100-CG	30

ISOLUTE® 103

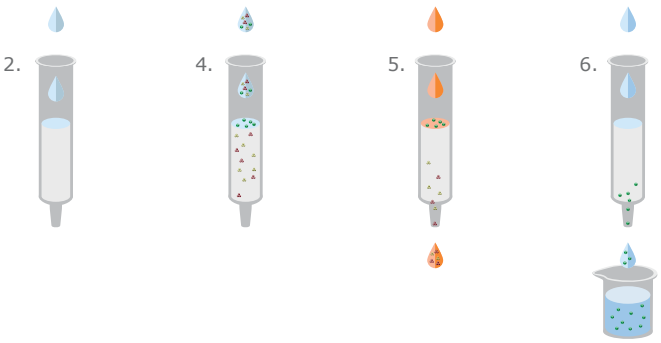
Concentration of Prep-LC Fractions Using Catch & Release

Base Material: Hydroxylated Polystyrene Divinylbenzene Co-polymer
Functional Group: N/A
Capacity: Up to 45% by weight (from 100% aqueous)
Counter Ion: N/A

ISOLUTE® 103 is a hydroxylated polystyrene divinylbenzene co-polymer. The resin is used for the isolation of a wide range of compounds from prep LC fractions using catch & release protocol. The approach replaces the need for time-consuming evaporation of aqueous based fractions.

Typical Procedure

1. Choose ISOLUTE 103 column, 5 times the total sample mass
2. Perform column equilibration, at 10–50 mL/min
3. Dilute sample to max 30% organic content
4. Load onto ISOLUTE 103 column, allow to flow under gravity
5. Wash column
6. Release organic product using methanol



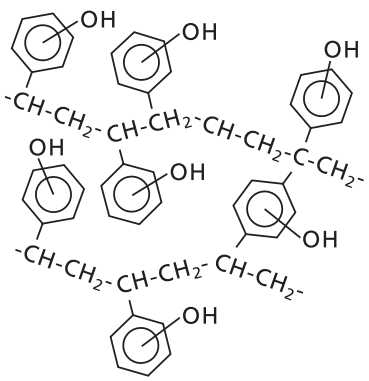


Figure 6. Chemical structure of ISOLUTE® 103, a hydroxylated polystyrene divinylbenzene co-polymer.

Selection Guide

Configuration	Part Number	Organic Sample Size
ISOLUTE 103 500 mg/6 mL	103-0050-C	100 mg
ISOLUTE 103 1 g/6 mL	103-0100-C	200 mg
ISOLUTE 103 2 g/25 mL	103-0200-E	400 mg
ISOLUTE 103 5 g/25 mL	103-0500-E	1 g
ISOLUTE 103 10 g/70 mL	103-1000-F-10	2 g

Ordering Information

Description	Part Number	Quantity
ISOLUTE® Cartridges		
ISOLUTE 103 200 mg/6 mL	103-0020-C	30
ISOLUTE 103 500 mg/6 mL	103-0050-C	30
ISOLUTE 103 1 g/6 mL	103-0100-C	30
ISOLUTE 103 2 g/25 mL	103-0200-E	30
ISOLUTE 103 5 g/25 mL	103-0500-E	30
ISOLUTE 103 10 g/70 mL	103-1000-F-10	30
ISOLUTE® Tabless Cartridges for High Throughput Work-up		
ISOLUTE 103 200 mg/6 mL, tabless	103-0020-CG	30
ISOLUTE 103 500 mg/6 mL, tabless	103-0050-CG	30

ISOLUTE® HM-N

Rapid Aqueous Work-up and Removal of Water Soluble Impurities from Reaction Mixtures

ISOLUTE® HM-N is a modified form of diatomaceous earth. The support has many uses in reaction work-up, including

- Dry loading for flash purification
- Removal of water-soluble impurities from reaction mixtures
- Removal of water from water-immiscible organic solvents
- Liquid-liquid extraction on a support

Figure 7. ISOLUTE® HM-N cartridges are available to extract sample volumes from 400 µL to 20 mL.

The use of a support eliminates emulsion formation at the interface of the two liquids. All protocols using ISOLUTE HM-N are processed using gravity flow.

When removing polar compounds or salts from reaction mixtures, an aqueous solution is initially immobilized on the ISOLUTE HM-N support. As the reaction mixture is applied to the cartridge, water soluble impurities transfer to the aqueous phase with the target compound remaining in the water-immiscible organic solvent.

ISOLUTE HM-N removes trace amounts of water from water-immiscible organic solvents. The maximum amount of water that can be adsorbed is 750 µL per g of ISOLUTE HM-N. This capacity may vary depending on the solvent used.

Ordering Information

Description	Part Number	Quantity
ISOLUTE® Cartridges		
ISOLUTE HM-N, 0.3 mL	800-0040-BM	100
ISOLUTE HM-N, 1 mL	800-0100-CM	100
ISOLUTE HM-N, 3 mL	800-0220-DM	100
ISOLUTE HM-N, 5 mL	800-0350-EM	100
ISOLUTE HM-N, 10 mL	800-0700-FM	50
ISOLUTE HM-N, 20 mL	800-1300-FM	50
ISOLUTE® Tabless Cartridges for High Throughput Work-up		
ISOLUTE HM-N, 0.3 mL, tabless	800-0040-BMG	100
ISOLUTE HM-N, 1 mL, tabless	800-0100-CMG	100
ISOLUTE® Bulk		
ISOLUTE HM-N, Bulk	9800-1000	1 Kg
ISOLUTE HM-N, Bulk	9800-5000	5 Kg

ISOLUTE® Sodium Sulfate Drying Cartridges

In-line Water Removal

Sodium sulfate is commonly used for drying water-immiscible organic solvents. ISOLUTE® Sodium Sulfate Drying Cartridges are a convenient alternative to using the bulk material. The male/female Luer design allows the cartridge to be placed in-line after the main work-up cartridge. Alternatively, connect to an empty reservoir and load larger volumes of solvent. No need to use additional equipment. Just plug in and filter for instant results.

The cartridge contains 2.5 g sodium sulfate and can remove up to 3.5 mL water.

Ordering Information

Description	Part Number	Quantity
ISOLUTE® Sodium Sulfate Drying Cartridge	802-0250-M	50

ISOLUTE® Empty Reservoirs

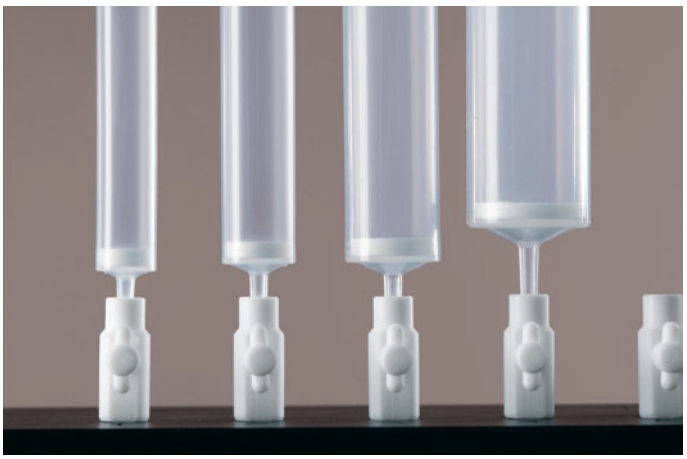
ISOLUTE® Empty Reservoirs extend the volume of all ISOLUTE catch & release and scavenging SPE, filtration, and supported liquid extraction cartridges. The empty reservoirs are attached to the main work-up cartridge using an ISOLUTE Cartridge Adaptor (see page 19).

The reservoirs are manufactured from polypropylene and are stable to all common reaction and work-up solvents. They can be used for room-temperature reactions, when used in conjunction with ISOLUTE Cartridge Caps and the Luer Tip Cap (see page 19).

Ordering Information

Description	Part Number	Quantity
ISOLUTE SG Empty Reservoir, 3 mL	120-1102-B	100
ISOLUTE SG Empty Reservoir, 6 mL	120-1103-C	100
ISOLUTE SG Empty Reservoir, 15 mL	120-1106-D	100
ISOLUTE SG Empty Reservoir, 25 mL	120-1107-E	100
ISOLUTE SG Empty Reservoir, 70 mL	120-1109-F	50
ISOLUTE SG Empty Reservoir, 150 mL	120-1110-J	25

ISOLUTE® Filtration Cartridges



ISOLUTE® Filtration Cartridges are used to perform a range of filtration operations during reaction work-up. The cartridges contain a single 20 µm polyethylene (PE) frit and are a convenient cost-effective alternative to traditional filtration devices that require washing and drying prior to further use.

Used in conjunction with Biotage's Resins or silica, ISOLUTE Filtration Cartridges provide an easy-to-use filtration device for quick and easy removal. Where the target compound is bound to the resin, wash steps are used to remove all impurities and by-products, before the compound is released using the appropriate conditions. Should the target compound be in solution, the reaction mixture is applied to the filtration cartridge; the media is filtered off, with the filtrate containing the required compound.

Catch & release and scavenging cartridges perform more reproducibly if the applied reaction mixture is particulate or precipitate free. ISOLUTE Filtration Cartridges can be attached to the main purification cartridge by means of an ISOLUTE Cartridge Adaptor (see page 19). The filtration cartridges remove the particulates, allowing the reaction mixture to flow freely through the work-up cartridge. Also available is the 50 mL ISOLUTE Wide Mouth Filtration Reservoir, where the filtered material is required after filtration. The 37 mm diameter reservoir allows rapid filtration and easy access for removal using a spatula.

Ordering Information

Description	Part Number	Quantity
ISOLUTE® Filtration Cartridges		
ISOLUTE SG Single Fritted Reservoir, 20 µm PE, 3 mL	120-1112-B	100
ISOLUTE SG Single Fritted Reservoir, 20 µm PE, 6 mL	120-1113-C	100
ISOLUTE SG Single Fritted Reservoir, 20 µm PE, 15 mL	120-1115-D	100
ISOLUTE SG Single Fritted Reservoir, 20 µm PE 25 mL	120-1116-E	100
ISOLUTE SG Single Fritted Reservoir, 20 µm PE, 70 mL	120-1118-F	50
ISOLUTE SG Single Fritted Reservoir, 20 µm PE, 150 mL	120-1119-J	25
ISOLUTE® Wide Mouth Filtration Cartridges		
ISOLUTE SG Wide Mouth Single Fritted Reservoir, 20 µm PE, 50 mL	120-1120-K	25
ISOLUTE® Tabless Cartridges for High Throughput Work-up		
ISOLUTE SG Single Fritted Reservoir, 20 µm PE, tabless, 3 mL	120-1112-BG	100
ISOLUTE SG Single Fritted Empty Reservoir, 20 µm PE, tabless, 6 mL	120-1113-CG	100

ISOLUTE® Phase Separators

ISOLUTE® Phase Separators are used to separate aqueous and chlorinated solvents following liquid-liquid extraction. The proprietary filtration device allows the flow of the organic solvent but holds up the aqueous layer (for up to 24 hours).

- Applications include: recovery of organic chlorinated fraction from LLE
- Features: automatic flow stop after organic has passed, work in parallel
- Benefits: walk up; walk away; more versatile than glass funnels; no washing, ready to use

Ordering Information

Description	Part Number	Quantity
ISOLUTE® Cartridges		
ISOLUTE Phase Separators, 3 mL	120-1903-B	100
ISOLUTE Phase Separators, 6 mL	120-1905-C	100
ISOLUTE Phase Separators, 15 mL	120-1906-D	100
ISOLUTE Phase Separators, 25 mL	120-1907-E	100
ISOLUTE Phase Separators, 70 mL	120-1908-F	50
ISOLUTE Phase Separators, 150 mL	120-1909-J	25
ISOLUTE® Tabless Cartridges for High Throughput Applications		
ISOLUTE Phase Separators, 3 mL, tabless	120-1903-BG	100
ISOLUTE Phase Separators, 6 mL, tabless	120-1905-CG	100

Biotage® Universal Phase Separator

Biotage® Universal Phase Separator is the latest concept in phase separation. These cartridges are fitted with a selectively permeable, optimized insert that separates aqueous phases from organic solvents under gravity.

The design is as simple as it is ingenious. There are no moving parts and nothing to prime, it's all achieved by hydrophobic/hydrophilic interactions. The cartridges arrive in kit form and are ready to use once assembled.

When a compound is partitioned between two immiscible liquids due to differences in solubility, the organic phase can pass through the separator wherever it is located (Figure 8), while the aqueous phase stays in the separator. There is an automatic cut-off at the organic/aqueous interface.

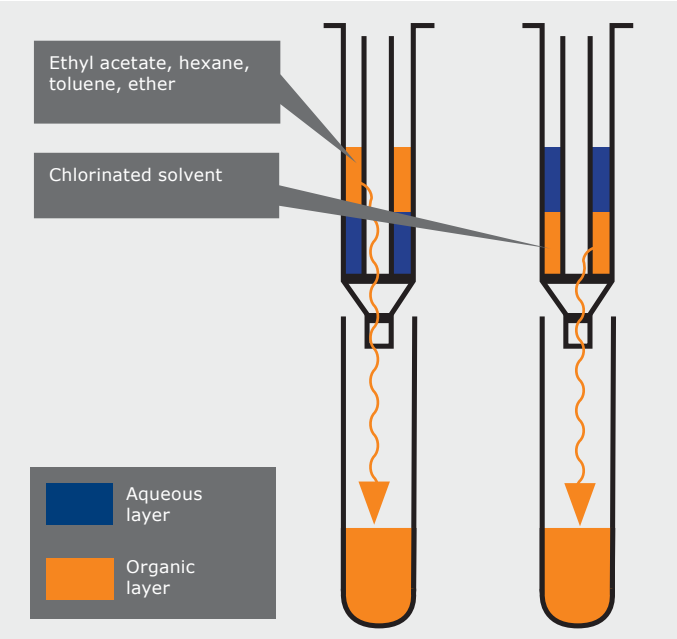


Figure 8. The organic phase will pass through the separator even if it is on top of an aqueous layer.

- Quickly and automatically isolate a range of organic phases
- Perfect when the organic phase is on top
- Designed especially for aqueous separations with hexanes, toluene, ethers, and ethyl acetate

Ordering Information

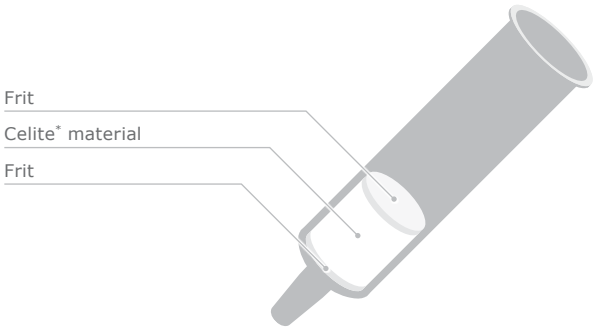
Description	Part Number	Quantity
Universal Phase Separator, 70 mL capacity Starter Kit: 2 tubes (including Luer fitting), 3 inserts, 3 caps, 2 Luer tips, instructions	120-1930-V	PK
Universal Phase Separator, 70 mL capacity Refill: 25 inserts, 25 splash guard caps, instructions	120-1931-V	25/PK
Accessories		
16 mm collection tube rack	123-2016	1
19 mm collection tube rack	123-2019	1
Universal PTFE stopcock	121-0009	10
PTFE stopcock/needle unit	121-0001	10
Sodium sulphate drying cartridge	802-0250-M	50

Celite* Cartridges

"Tar" and Catalyst Removal During First-stage Reaction Work-up

Celite* cartridges are used as a filtration device for removal of "tar" and particulate materials (e.g. catalysts, as first- stage work-up following organic synthesis).

The cartridges contain an inert Celite material, a modified diatomaceous earth, with an optimized particle-size distribution for flow-through processing. The cartridge holds up catalysts such as insoluble metal oxides and Pd/C, providing filtrates for subsequent work-up. The retention of the catalyst in a cartridge format minimizes safety issues and cross-contamination, a common problem when the catalyst is captured in an open filtration device such as a sintered funnel.



Ordering Information

Description	Part Number	Quantity
Celite* Cartridges		
Celite column, 2.5 g/25 mL	810-0250-E	20
Celite column, 10 g/150 mL	810-1000-J	8

*Celite is a trademark owned by Johns-Manville Corporation.

Metal Scavenging Tool Kit

Biotage supported resin and silica based metal scavengers are effective reagents for the removal of trace metals (such as PGMs) from catalyzed reactions to final APIs. This technology can be applied to a variety of different industries, from pharmaceutical to fine chemical; from agrochemical to water and waste treatment.

Solid supported metal scavengers have been shown to be highly selective, and also offer cost-effective scavenging, enabling chemists to reach metal purity goals[1]. Precious metals such as Pd, Pt, Ru and Rh in organometallic catalysts are becoming more widespread in industrial synthesis due to atom economy and green credentials[2,3]. These PGM group catalyzed reactions are commonly used in the manufacture of active pharmaceutical ingredients (APIs) and fine chemicals. Achieving purity levels for metal contamination is becoming increasingly challenging, with limits of 5 ppm (ingested), and 1 ppm (parenteral) API now the benchmarked standard[4]. This poses particular difficulties in downstream purification of Pd based chemistries.

Traditional methods to remove metals include chromatography, activated carbon, extraction, distillation and recrystallization but these can offer poor selectivity and lead to high API loss. Biotage has assembled an optimized tool kit (K-MS-2) to facilitate the process of metal screening and method development.

Biotage are leaders in metal scavenging in a variety of different application areas.

Tools of the Metal Removal Trade

- Now incorporating the industry leading universal scavenger for metal scavenging and removal work, Biotage® MP-TMT
- Higher metal affinity – low Kd(Pd) relative to API Kd(Pd) – excellent metal scavenging
- Fast kinetics and filtration at room temperature – enhanced by heating
- Diverse solid supports – silica and polystyrene backbones
- Work Flow Compatible – generic, use in diverse conditions
- Minimal loss of API – less / no non-specific binding
- Higher purity of final product – no leachables
- Short development time – faster method optimization

Features

- Mechanically robust, and may be stirred vigorously without breakdown
- Bioanalytical grade silica or ultra clean polystyrene polymers
- Can also be added in batch processes and stirred
- Optimum flow characteristics as fixed beds
- May be stored in closed containers at RT, or longer term in a cool dry (4 °C) environment

What is in the Box

- MP-TMT 3 g
- SCX-2 3 g
- Si-TMT 3 g
- Si-TMT 500 mg/6 mL cartridges Pk/5
- Si-Thiol 10 g
- Si-Trisamine 10 g

See the “Metal Scavenger User Guide” (part number UI317) for more details.

Description	Part Number	Quantity
Biotage® Metal Scavenging Tool Kit	K-MS-2	1

References

1. Welch, C.J.; Albaneze-Walker, J.; Leonard, W.R.; Biba, M.; DaSilva, J.; Henderson, D.; Laing, B.; Mathre, D.J.; Spencer, S.; Bu, X.; Wang, T.; *Org. Proc. Res. Dev.* **2005**, 9, 198–205
2. King, A. O.; Yasuda, N. *Topics in Organometallic Chemistry*, **2004**, 6, 205–245.
3. Carey, J.S.; Laffan, D.; Thompson, C.; Williams, M.T. Org. *Biolmol. Chem.* **2006**, 4, 2337–2347.
4. European Agency for the Evaluation of Medicinal Products, *Guidelines on the Specification Limits for Residues of Metal Catalysts or Metal Reagents*, 2008. Accessed December **2009**: http://www.emea.europa.eu/pdfs/human/swp/444600en.pdf

Biotage® Argoscoop™

Resin Dispenser – One of the Most Useful and Coveted Lab Accessories Around

Biotage® Argoscoop™ resin dispenser is a variable volume resin scoop designed for convenient dispensing of polymer scavengers and reagents. The table below is a guide for estimating fill weights (in milligrams rounded to the nearest 10 mg) for a variety of media when using a specific setting. Repetitive fill weights are typically within 10% of one another and show greater precision at larger settings. It is recommended that at least one test weight should be measured for the desired setting.

Chart for Estimating Fill Weights

ArgoScoop Settings	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Scavengers (weight in mg)											
PS-Benzaldehyde	80	150	220	290	360	430	500	570	640	710	780
MP-Carbonate	40	90	150	200	250	310	360	420	470	520	580
PS-Isocyanate	40	80	120	160	200	250	290	330	370	410	450
MP-Isocyanate	50	90	130	170	210	240	280	320	360	400	440
MP-TMT	40	70	100	130	160	200	230	260	290	320	360
MP-Trisamine	30	60	90	120	150	180	220	250	280	310	340
PS-TsNHNH$_2$	40	110	170	230	300	360	430	490	550	620	680
MP-TsOH	70	130	180	240	300	350	410	460	520	580	630
Resin-Bound Reagents											
MP-Borohydride	60	120	180	240	290	350	410	470	520	580	640
PS-Carbodiimide	80	130	180	240	290	350	400	460	510	570	620
MP-Cyanoborohydride	60	120	170	230	280	340	390	450	500	560	620
PS-HOBt(HL)	70	110	160	200	250	300	340	390	440	480	530
PS-PPh$_3$-Pd	50	100	140	180	220	260	310	350	390	430	470
PS-TBD	60	110	160	200	250	300	350	390	440	490	530
MP-Triacetoxyborohydride	60	110	150	200	250	290	340	390	430	480	530
PS-Triphenylphosphine	90	150	210	270	330	390	450	510	570	630	700
Si-Scavengers (weight in mg)*											
Si-Thiol	92	166	243	306	386	440	514	601	663	724	812
Si-Trisamine	90	152	217	278	356	416	473	556	621	690	746
Si-TMT	95	167	241	323	391	465	544	602	684	751	848
Si-Propylsulfonic acid (SCX-2)	91	151	220	284	353	422	487	556	623	681	759

*Standard deviation ~ 10–20 mg.

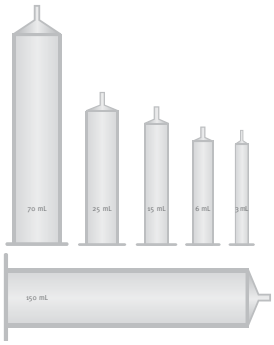
Processing Stations

Biotage® FlashVac Sample Processing Manifolds

Biotage® FlashVac-10 and -20 Sample Processing Manifolds are used to process standard Luer tipped work-up cartridges or flash cartridges. Constructed from glass or high density polyethylene, the FlashVac manifolds are compatible with commonly used reaction and work-up solvents.

ISOLUTE® Work-up Cartridges

ISOLUTE® cartridges are available in a range of configurations to meet all reaction scale requirements for work-up applications. Working volumes (limited by the collection vessel volume) range from 3 to 150 mL. Cartridges are available in a range of masses for work-up of 1 mg to 70 g of target compound. Process up to 10 or 20 cartridges in parallel using the FlashVac Sample Processing Manifolds (see below).



Gravity racks are available for maximum convenience and hands on processing transparency.

ISOLUTE® Filtration Cartridges

- For all filtration applications
- Polypropylene tubes fitted with 20 µm polyethylene frits – excellent solvent resistance
- Standard sizes from 1–150 mL
- Wide-mouth filtration cartridge for easy access to filtered material
- 24, 48, and 96-well formats also available for high throughput applications
- Seal with caps and Luer tip caps for carrying out room temperature reactions

ISOLUTE® Frits

- Use when sample loading ISOLUTE® flash cartridges, filtration, catch & release, and scavenging applications
- 10 and 20 µm PE frits
- 20 µm PTFE frit options

Celite* Cartridges for “Tar” and Catalyst Removal

Pre-packed cartridges containing an inert Celite* material with an optimized particle size for rapid cleanup.

- Filtration device for the removal of “tars” or precipitators from crude reaction mixtures
- Catalyst removal from reaction mixtures

*Celite is a trademark owned by Johns-Manville Corporation.

ISOLUTE® Empty Reservoirs

- Polypropylene 1–150 mL sizes
- Attach to ISOLUTE® cartridges and used on any work-up application to extend the volume that can be applied in one aliquot
- Seal with cartridge caps and Luer tip cap for carrying out room temperature reactions

ISOLUTE® SPE Cartridge Adaptors

- For stacking empty reservoirs and filtration cartridges above catch & release and scavenging SPE cartridges
- Polyethylene and PTFE options

ISOLUTE® SPE Cartridge Caps and Luer Tip Cap

For sealing cartridge inlets or Luer tips to allow:

- Liquid-filled ISOLUTE® cartridges to be transported from one location to another
- Room-temperature reactions in empty reservoirs or filtration cartridges

PTFE Stopcocks and Needles

- PTFE stopcock and stopcock needle unit options allows individual cartridge flow control
- Provide excellent solvent resistance for use on FlashVac and Gravity Rack Sample Processing Manifolds

ISOLUTE® Accessories

Caps, Plugs and Frits

Biotage offers a range of accessories for use with ISOLUTE® products for reaction work-up and purification. These accessories include cartridge caps for all cartridge sizes, Luer tip caps, cartridge adaptors, and polyethylene and PTFE frits. The accessories are used for room-temperature reactions, reaction work-up, and purification procedures, including solid sample loading onto ISOLUTE flash chromatography cartridges and flow control through individual cartridges.

ISOLUTE® Cartridge Adaptors

ISOLUTE® Cartridge Adaptors allow empty reservoirs and filtration cartridges to be attached to the main cartridge. This increases the volume that can be added to the cartridge in a single step or prevents particulate matter blocking the top frit of the cartridge. The adaptors are made of polyethylene or PTFE and are available for all ISOLUTE cartridge sizes.

ISOLUTE® Cartridge Caps

ISOLUTE® Cartridge Caps are used to seal either the cartridge inlet (all cartridge sizes) or the Luer outlet. The caps allow ISOLUTE cartridges to be transported from one location to another or for room-temperature reactions to be performed in either the empty reservoirs or filtration cartridges.

ISOLUTE® Polyethylene and PTFE Frits

Biotage products are based on fritted systems consisting of sintered particles (polyethylene [PE] or PTFE) which are compressed to produce a porous material. The nominal porosity of the frit is the average or mean size (e.g. 20 µm). The frits are relatively thick, which means the pores run through the material in a multidirectional channel system, allowing the frit to behave as a filter.

Biotage offers two materials, polyethylene (10 and 20 µm) and PTFE (20 µm) as standard. Other porosities are available through our Custom Manufacturing Service. The frits can be used as part of the solid sample loading technique prior to flash chromatography or in the construction of catch & release, scavenging SPE or filtration devices.

Cartridge caps (red) and luer tips (transparent).

Ordering Information

Description	Part Number	Quantity
ISOLUTE® Cartridge Adaptors		
Column Adaptor, PTFE (1, 3 & 6 mL columns)	120-1100	10
Column Adaptor, PE (1, 3 & 6 mL columns)	120-1101	10
Column Adaptor, PE (15 & 25 mL columns)	120-1102	10
Column Adaptor, PE (70 mL columns)	120-1103	10
Column Adaptor, PE (150 mL columns)	120-1106	5
ISOLUTE® Cartridge Caps		
Luer tip cap (fits all columns)	1201-0120	100
Top Cap, 3 mL column	1201-0122-B	100
Top Cap, 6 mL column	1201-0123-C	100
Top Cap, 15 mL column	1201-0126-D	100
Top Cap, 25 mL column	1201-0127-E	100
Top Cap, 70 mL column	1201-0128-F	100
Top Cap, 150 mL column	1201-0129-J	50
ISOLUTE® polyethylene and PTFE frits		
ISOLUTE 20 µm PE Frits, 9 mm, 3 mL	120-1033-B	100
ISOLUTE 20 µm PE Frits, 13 mm, 6 mL	120-1035-C	100
ISOLUTE 20 µm PE Frits, 16 mm, 15 mL	120-1036-D	100
ISOLUTE 20 µm PE Frits, 20 mm, 25 mL	120-1037-E	100
ISOLUTE 20 µm PE Frits, 27 mm, 70 mL	120-1038-F	100
ISOLUTE 20 µm PE Frits, 37 mm, 150 mL	120-1039-J	50
ISOLUTE 10 µm PE Frits, 9 mm, 3 mL	120-1062-B	100
ISOLUTE 10 µm PE Frits, 13 mm, 6 mL	120-1063-C	100
ISOLUTE 10 µm PE Frits, 16 mm, 15 mL	120-1065-D	100
ISOLUTE 10 µm PE Frits, 20 mm, 25 mL	120-1066-E	100
ISOLUTE 10 µm PE Frits, 27 mm, 70 mL	120-1067-F	100
ISOLUTE 10 µm PE Frits, 37 mm, 150 mL	120-1068-J	50
ISOLUTE 20 µm PTFE Frits, 9 mm, 3 mL	120-1072-B	100
ISOLUTE 20 µm PTFE Frits, 13 mm, 6 mL	120-1073-C	100
ISOLUTE 20 µm PTFE Frits, 16 mm, 15 mL	120-1075-D	100
ISOLUTE 20 µm PTFE Frits, 20 mm, 25 mL	120-1076-E	100
ISOLUTE 20 µm PTFE Frits, 27 mm, 70 mL	120-1077-F	100
Processing Stations		
Flashvac-10 With 19Mm 10 Position Rack	122-1019	1
Flashvac-10 10 Ports With 25Mm Rack	122-1025	1
Flashvac-10 19Mm Rack	122-1030	1
Flashvac-10 Rack For 25 Mm Tubes	122-1034	1
Flashvac-20 With 19Mm 20 Position Rack	122-2019	1
Flashvac-20 With 25Mm 10 Position Rack	122-2025	1
Flashvac-20 19Mm Rack	122-2061	1
Flashvac-20 25Mm Rack	122-2062	1
Flashvac Silicone Lid Gasket	122-0030	1
Flashvac-10 Lid	122-0047	1
Flashvac-20 Lid, Complete	122-0048	1
Flashvac 10 & 20 Glass Tank	122-0049	1
Gravity Rack (with 16mm tube rack)	123-2016	1
Gravity Rack (with 19mm tube rack)	123-2019	1
Needles | Stopcocks | Scoops		
PTFE stopcock/needle unit	121-0001	10
PTFE needle	121-0002	10
Stainless steel needle	121-0003	20
Stainless steel needle retainer	121-0004	10
Universal PTFE stopcock	121-0009	10
Argoscoop	300427	1

Resin Selection Guide

Find the Right Resin For Your Chemistry

Product	Metal Scavenging	Peptide / Coupling Chemistry	Reductive Amination	Oxidation	C-C Bond Formation	Work-up Scavenging
MP-TMT	■					
Si-TMT	■					
Si-Thiol	■					
Si-Trisamine	■					■
SCX-2	■		■			■
PS-Carbodiimide		■		■		
PS-TBD		■			■	
PS-HOBt		■				■
MP-Triacetoxyborohydride			■			
MP-Cyanoborohydride			■			
MP-Borohydride			■			
PS-TsNHNH2			■			■
PS-Isocyanate			■			■
MP-Isocyanate			■			■
MP-Carbonate					■	■
PS-PPh3-Pd					■	
PS-PPh3					■	■
PS-Benzaldehyde			■			■
PS-TEMPO			■	■		
MP-TsOH	■		■			■
MP-Trisamine	■		■			■

■ Excellent/Preferred

■ Very Good

Biotage specializes in a range of resins designed for a large variety of applications.

For more information visit **www.biotage.com**

Metal Scavenger Selection Guide

Final Result: Typically <10 ppm

Product	Particle Size (µm)	Ligand-M Strength	Compatible API's	Batch Performance	Fixed Bed (Cartridge) Performance	Main Metals Scavenging	Typical Catalysts	Typical Reactions	Other Metals Scavenged	Solvent Compatibility	Typical Load vs. API (flow)	Typical Load vs. API (batch)
MP-TMT	150–350	■	ABN*	■	■	Pd	$Pd(OAc)_2$, $Pd(PPh_3)Cl_2$, $Pd(PPh_3)_4$, $Pd(dppf)Cl_2$	Suzuki, Heck, Sonogashira, Ulman etc.	Rh, Ru, Pt, Ni, Rh	All¨	n/a	2–20 wt%
Si-TMT	45–60	■	ABN*	■	■	Pd	$Pd(OAc)_2$, $Pd(PPh_3)Cl_2$, $Pd(PPh_3)_4$, $Pd(dppf)Cl_2$	Suzuki, Heck, Sonogashira, Ulman etc.	Rh, Ru,Pt, Ni, Rh	All¨	5–10 eq	2–20 wt%
Si-Thiol	45–60	■	ABN*	■	■	Pd	$Pd(OAc)_2$, $Pd(PPh_3)Cl_2$, $Pd(PPh_3)_4$, $Pd(dppf)Cl_2$	Suzuki, Heck, Sonogashira, Ulman etc.	Rh, Ru, Pt, Ni, Rh	All¨	5–10 eq	2–20 wt%
SCX-2	45–60	■	AN**	■	■	Fe	M˘(I)	Various	M˘(I)	All¨	5–10 eq	2–20 wt%
Si-Trisamine	45–60	■	BN***	■	■	Pd	$Pd(OAc)_2$, $Pd(PPh_3)Cl_2$, $Pd(PPh_3)_4$, $Pd(dppf)Cl_2$ M(II)	Suzuki, Heck, Sonogashira, Ulman etc.	Ni, Sn, Fe, Cu, Zn, M(II)	All¨	5–10 eq	2–20 wt%

■ Excellent/Preferred
■ Very Good
■ Good

*ABN for Acids, bases, neutral products, 2 > pH > 10, extremes possible for short times
**AN for Acids, neutral products, 2 > pH > 10, extremes possible for short times
***BN for Bases, neutral products, 2 > pH > 10, extremes possible for short times
˘M = Transition metal
¨All common laboratory and process solvents

Notes

Your Complete Partner for Effective Chemistry

Biotage is a worldwide supplier of instruments and accessories designed to facilitate the work of laboratory and process chemists. With our deep knowledge of the industry, academic contacts and in-house R&D teams, we can deliver the best solutions to your challenges. We take great pride in our flexibility and ability to meet our customer's individual needs. With strong foundations in both analytical, organic and process chemistry, we can offer the widest range of solutions available on the market.

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