

Chromatography Columns

A complete range of prepacked and empty columns and accessories are available for protein and peptide separations. Bio-Rad's many disposable spin and gravity chromatography columns are made of chemically compatible polypropylene, are autoclavable, and can be washed with NaOH. Our low-pressure glass Econo-Column® chromatography columns offer an ideal combination of performance, reliability, and value. For high-resolution separations, Bio-Rad's Bio-Scale™ MT medium-pressure columns can be run on a variety of liquid chromatography systems and are provided prepacked with selected media.

Prepacked Chromatography Columns

Prepacked Cartridge Selection Guide by Application

Application	Media	Type of Separation	Chemical Form	Binding Capacity/ml*
Protein and Plasmid Purification				
	Macro-Prep® High Q	Strong anion exchange	-N ⁺ (CH ₃) ₃	≥37 mg BSA
	UNOsphere™ Q	Strong anion exchange	-N ⁺ (CH ₃) ₃	180 mg BSA
	UNOsphere S	Strong cation exchange	-SO ₃ ⁻	60 mg human IgG
	Macro-Prep DEAE	Weak anion exchange	-HN ⁺ (C ₂ H ₅) ₂	>35 mg protein
	UNOsphere Rapid S	Strong cation exchange	SO ₃ ⁻	Human IgG: 60 mg/ml*
	CHT™ ceramic hydroxyapatite	Hydroxyapatite	(Ca ₅ (PO ₄) ₃ OH) ₂	Human IgG: 25–60 mg/ml*
	CFT™ ceramic fluoroapatite	Fluoroapatite	Ca ₁₀ (PO ₄) ₆ F ₂	Lysozyme: 14–21.5 mg/g
Protein Purification				
	Nuvia™ S	Strong cation exchange	-SO ₃ ⁻	110 mg/ml IgG
	Macro-Prep High S	Strong cation exchange	-SO ₃ ⁻	≥49 mg human IgG
	UNOsphere Rapid S	Strong cation exchange	SO ₃ ⁻	Human IgG: 60 mg/ml*
	CHT ceramic hydroxyapatite	Hydroxyapatite	(Ca ₅ (PO ₄) ₃ OH) ₂	Human IgG: 25–60 mg/ml*
	CFT ceramic fluoroapatite	Fluoroapatite	Ca ₁₀ (PO ₄) ₆ F ₂	Lysozyme: 14–21.5 mg/g
IgG Purification				
	DEAE Affi-Gel® Blue	Affinity	Cibacron Blue F3GA and DEAE	0.2–1.0 ml serum
Antibody Purification				
	Nuvia S	Strong cation exchange	-SO ₃ ⁻	110 mg/ml IgG
	Affi-Prep® protein A	Affinity	Protein A	8–10 mg mouse monoclonal IgG, 16–23 mg human IgG
	CHT Type I, 40	Hydroxyapatite	(Ca ₅ (PO ₄) ₃ OH) ₂	25–60 mg human IgG
	CHT Type II, 40	Hydroxyapatite	(Ca ₅ (PO ₄) ₃ OH) ₂	15–25 mg human IgG
	CFT	Fluoroapatite	Ca ₁₀ (PO ₄) ₆ F ₂	Lysozyme: 14–21.5 mg/g
	UNOsphere SUPrA™	Affinity	rProtein A	Human IgG: 30 mg/ml*
Affinity-Tagged Protein Purification				
	Profinity™ IMAC	Affinity	Iminodiacetic acid	≥15 mg recombinant His-tagged protein
	Profinity GST	Affinity	Glutathione	≥10 mg/ml recombinant GST-tagged protein
	Profinity eXact™	Affinity tag	Modified subtilisin	>3 mg/ml tag-free maltose Binding protein/ml resin
Desalting, Buffer Exchange				
	Bio-Gel® P-6	Gel filtration	Polyacrylamide	10–22% CV
Purification of Serum Proteins, Enzymes				
	Affi-Gel Blue	Affinity	Cibacron Blue F3GA	0.2 ml serum 11 mg albumin
Monoclonal Antibody Purification				
	Nuvia S	Strong cation exchange	-SO ₃ ⁻	110 mg/ml IgG
	UNOsphere SUPrA	Affinity	rProtein A	Human IgG: 30 mg/ml*
	CHT Type I, 40 μm	Hydroxyapatite	(Ca ₅ (PO ₄) ₃ OH) ₂	Human IgG: 25–60 mg/ml
	UNOsphere Q	Strong anion exchange	-N ⁺ (CH ₃) ₃	BSA 180 mg/ml*

* Binding capacity based on bulk media; check individual instruction manuals for run conditions and specifications.

See Also

Bottled media:
pages 33–40, 43–49.
BioLogic systems:
pages 77–84.
Econo pump:
page 90.
Profinia protein
purification system:
pages 92–93.

Bio-Scale™ Mini Cartridges

Order Info: Pg 70

Bio-Scale Mini cartridges have a double-wall cartridge design* that provides extra durability and allows easy, reliable runs at pressures up to 45 psi using the aqueous buffers most commonly used for protein separation. The cartridges are prepacked with Bio-Rad's chromatography media for ion exchange, affinity, size exclusion, or hydroxyapatite technology and are available in 1, 5, 10, and 50 ml formats. Bio-Scale Mini cartridges are convenient and ready to use.

The cartridges can be used with any chromatography system and are ideal with the BioLogic™ systems, the Profinia™ system, or a peristaltic pump. For simple step elution, the cartridges can be used with a Luer-Lok syringe. Fittings are available for connection to HPLC-, FPLC-, and ÄKTA systems.

For More Information

Web: www.bio-rad.com/lpcartridges

Request or download bulletins: 5444, 5574, and 5584



Bio-Scale™ Mini Cartridge Protein Purification Sampler Packs

Order Info: Pg 70

Protein purification sampler packs offer a quick way to experiment with separation techniques when the protein to be purified has not yet been characterized. The Bio-Scale Mini ion exchange sampler pack includes a 1 ml UNOsphere™ Q cartridge, 1 ml UNOsphere S cartridge, 1 ml Macro-Prep® Q cartridge, 1 ml Macro-Prep S cartridge, and 1 ml Macro-Prep DEAE cartridge.

The Bio-Scale Mini affinity sampler pack includes a 1 ml IMAC cartridge, 1 ml GST cartridge, 1 ml Affi-Prep® protein A cartridge, 5 ml DEAE Affi-Gel® Blue cartridge, and 5 ml Affi-Gel Blue cartridge. For a complete chart of all cartridges, see page 61.

For More Information

Web: www.bio-rad.com/lpcartridges

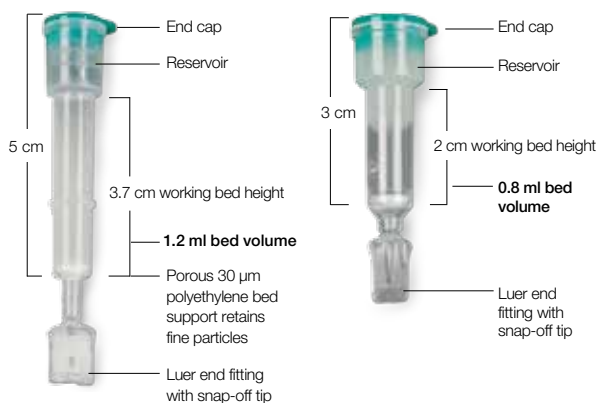
* U.S. patent 7,208,087.

Bio-Spin® and Micro Bio-Spin™ Columns

Order Info: Pg 70

Bio-Spin 6 and Micro Bio-Spin 6 columns are ideal for desalting protein samples quickly using size exclusion chromatography. Filled with Bio-Gel® P-6 or P-30 media, these columns are shipped fully hydrated in Tris buffer and are ready to use. These products effectively clean up and remove salts, nucleotides, dye terminators, and small molecules from protein, RNA, and DNA samples in just 10 minutes, and are autoclavable.

- Provide fast salt and contaminant removal in an easy-to-use spin-column format
- Remove compounds <6 kD by size exclusion chromatography
- Accommodate up to 100 µl of sample



For More Information

Web: www.bio-rad.com/biospin

Bio-Spin Columns Selection Guide

	Bio-Spin 6	Micro Bio-Spin 6	Bio-Spin 30	Micro Bio-Spin 30
Equilibration buffer	SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*
Applications	Desalting and buffer exchange	Desalting and buffer exchange	Desalting; nucleotide and small molecule removal	DNA sequencing reaction mixtures (Tris) and small molecule removal
Retention and recovery	90% recovery of 20 bases or bp, 99% retention of salts	90% recovery of 20 bases or bp, 99% retention of salts	95% recovery of 22 bases or bp, 98% retention of ddNTPs	95% recovery of 22 bases or bp, 98% retention of ddNTPs
MW exclusion limit, globular proteins	6,000	6,000	40,000	40,000
Sample volume	50–100 µl	10–75 µl	50–100 µl	10–75 µl
Centrifuge type	Swinging bucket	Microcentrifuge	Swinging bucket	Microcentrifuge

* 150 mM NaCl, 17.5 mM sodium citrate, pH 7.0

Mini Bio-Spin™ Columns

Order Info: Pg 71

Mini Bio-Spin columns are available with 0.6 ml prepacked media for both affinity-tagged purification and protein enrichment applications and contain the following media:

- **Profinity eXact™ media** — for affinity-tagged purification and on-column cleavage; see page 40
- **ProteoMiner™ beads** — for protein enrichment of low-abundance proteins from biological samples; see page 11

For More Information

Web: www.bio-rad.com/minibiospin

Request or download bulletins: Profinity eXact fusion-tag system — 5725, 5742, and 5766; ProteoMiner beads — 3096 and 5635

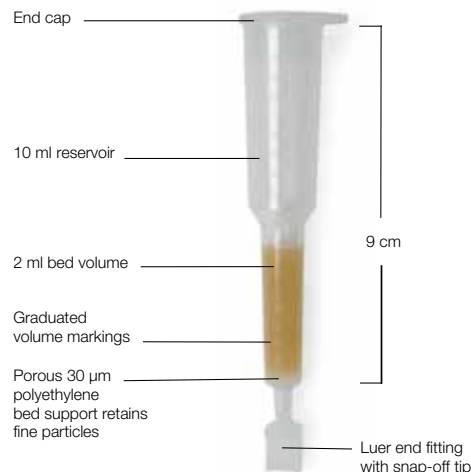


Poly-Prep® Ion Exchange Columns

Order Info: Pg 71

Poly-Prep prepacked columns for gravity-flow chromatography provide convenience for sample preparation and other small-scale applications. The graduated polypropylene columns hold a standard bed volume of 2 ml of AG® ion exchange resin and include an integral 10 ml reservoir. A Poly-Prep stack cap, which allows connection to pumps, reservoirs, or columns in series, is also available.

For More Information
Web: www.bio-rad.com/polyprep



See Also

Bio-Scale replacement parts: page 75.
BioLogic DuoFlow systems: pages 77–84.
CHT media: page 36.
Bio-Scale Mini cartridges: page 62.

Bio-Scale™ CHT™ Type I Columns

Order Info: Pg 71

Bio-Scale CHT Type I columns are packed with CHT ceramic hydroxyapatite, Type I 10 µm media, which has high affinity for basic proteins and lower affinity for acidic proteins. These prepacked columns allow rapid, reproducible high-resolution separations for analytical to semipreparative medium-pressure applications. These columns are ideal for use with any medium- to high-pressure chromatography system. Available bed volumes are 2, 5, 10, and 20 ml.

Bio-Scale CHT Type I Column Top-Off Support Kit

If the top of the column bed becomes fouled and the usual hygiene steps do not restore performance, a few milliliters of the bed can be removed and replaced with fresh support. The Bio-Scale CHT Type I column top-off support kit contains 1 ml support, frits, and distribution screens for each column diameter.



For More Information
Web: www.bio-rad.com/bioscaleCHT

See Also

UNOsphere ion exchange media: page 33.
BioLogic DuoFlow systems: pages 77–84.

UNO® Monolith Ion Exchange Columns

Order Info: Pg 71

UNO monolith ion exchange columns contain a patented* continuous-bed matrix, allowing biomolecule separations at high flow rates without sacrificing resolution or capacity.

UNO columns run at low backpressures on the BioLogic DuoFlow™ system or any other medium- to high-pressure chromatography system. A 1 ml UNO column can complete a high-resolution separation in about 3 minutes. UNO columns are also available in 6 and 12 ml sizes.



* U.S. patent 6,423,666.

The unique homogeneous UNO matrix:

- Has high capacity, even at high flow rates, due to the dense network of nodules that contain the ionic functional groups. These groups are completely accessible to biomolecules via the interconnecting channels
- Has the highest quality and batch-to-batch reproducibility
- Prevents fragmentation, so columns last longer
- Is stable from pH 2 to 12
- Is available for strong anion (Q) and strong cation (S) exchange

UNO glass columns — UNO glass columns provide high-resolution separation of biomolecules. The transparent glass

tube allows easy bed inspection and column troubleshooting. Three column sizes provide flexibility for purification protocols.

UNO replacement columns — UNO replacement columns provide a simple bed replacement as an alternative to purchasing a new column.

UNO polishing PEEK columns — UNO polishing columns, 0.16 ml, are a late-stage purification tool to obtain the highest resolution and recovery from small sample loads. They allow you to purify and concentrate dilute samples in one step.

For More Information

Web: www.bio-rad.com/unomonolith
Request or download bulletin: 2116

Aminex® HPLC Columns

Order Info: Pg 72

Aminex HPLC columns are packed with a polystyrene divinylbenzene resin. Aminex media have high pressure stability, wide pH stability, and high column efficiency and selectivity. Aminex HPLC columns separate compounds using the ion-moderated partition chromatography technique. Aminex columns are an industry standard for the analysis of carbohydrates, organic acids, organic bases, and other small organic molecules including peptides and nucleic acids. To separate complex mixtures with Aminex columns, simple isocratic mobile phases (often just water) and precise temperature control are used.

For More Information

Web: www.bio-rad.com/aminex
Request or download bulletin: 1928



See Also

Organic acid standard: page 50.
Carbohydrate standard: page 50.

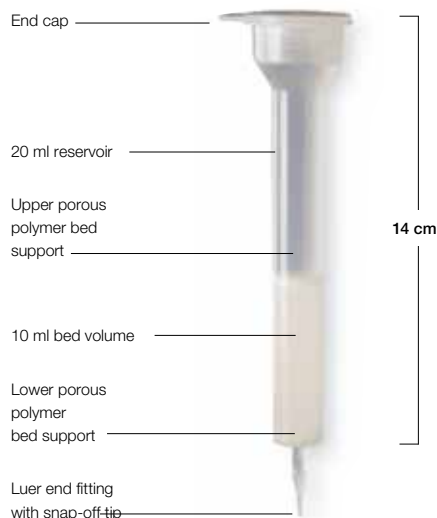
Econo-Pac® Affinity and Desalting Columns

Order Info: Pg 73

Econo-Pac prepacked columns for gravity-flow chromatography allow fast and easy desalting, as well as simplified antibody purification.

Econo-Pac protein A columns are well suited for binding of IgG's, especially from mammalian species. Econo-Pac columns with DEAE Affi-Gel® Blue, an affinity/anion exchange chromatography media, are well suited for obtaining highly pure IgG from a variety of species from serum samples. The Econo-Pac 10DG media, with a molecular exclusion limit of 6,000, is recommended specifically for desalting and buffer exchange.

The prepacked Econo-Pac columns include an upper frit, a snap-off end tip, graduated column markings, a 10 ml bed, and 30 ml total column volume. To improve column performance, use a flow adaptor, see page 68. For bottled size exclusion media, see pages 47–48; for bottled affinity media, see pages 39–40 and 43–46.



See Also

Affi-Gel protein A MAPS II kit: page 44.
Affi-Gel protein A media: page 44.
DEAE Affi-Gel Blue media: page 44.

Empty Columns

Bio-Rad's empty columns accommodate a range of chromatography needs, including spin columns, low-pressure columns with optional flow adaptors and jackets for temperature control, and analytical columns for medium- or high-pressure systems.

For More Information

Web: www.bio-rad.com/emptycolumns

See Also

Prepacked Bio-Spin, Micro Bio-Spin, and Mini Bio-Spin columns: page 63.

Bio-Spin[®], Micro Bio-Spin[™], and Mini Bio-Spin Columns

Order Info: Pg 73

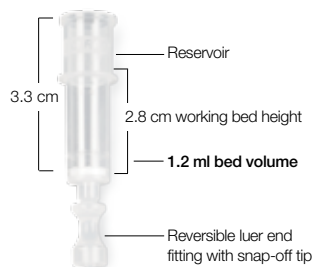
Empty Bio-Spin and Micro Bio-Spin chromatography columns are disposable polypropylene spin columns that can be packed with a variety of chromatographic media. Bio-Spin columns hold up to 1.2 ml of any media and fit in standard swinging bucket centrifuges; Micro Bio-Spin and Mini Bio-Spin columns hold up to 0.8 ml and 1.2 ml of media respectively, and fit in standard microfuges. All three columns fit standard collection tubes, have snap-off tips and polyethylene bed supports, and are autoclavable.

For More Information

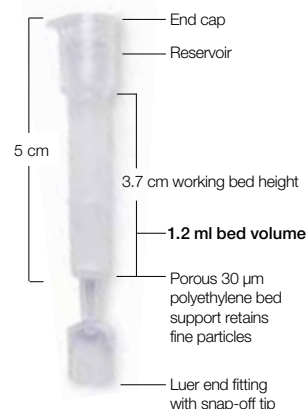
Request or download bulletin: 2289



Micro Bio-Spin Column



Mini Bio-Spin Column



Bio-Spin Column

See Also

Prepacked Econo-Pac columns: page 65.

Econo-Pac[®] Columns

Order Info: Pg 73

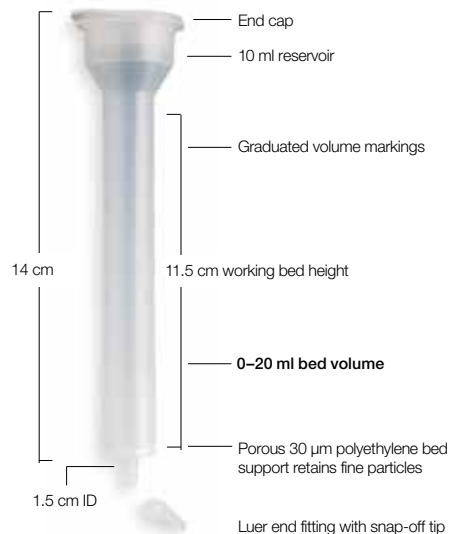
Econo-Pac columns are 14 cm high, 1.5 x 12 cm polypropylene columns that may be fitted with a flow adaptor (see page 68) or used for gravity-flow chromatography. When used for open column work, a special upper bed support prevents the bed from running dry. Bed volumes from 1 to 20 ml are acceptable. These columns can be autoclaved and will retain fine particles. Columns can be easily stored in poly column racks.

For More Information

Request or download bulletin: 2289



Poly Column Rack



Poly-Prep® Columns

Order Info: Pg 73

See Also

Prepacked Poly-Prep columns: page 64.

Poly-Prep columns are 9 cm high, conical 0.8 x 4 cm polypropylene columns that hold up to 2 ml of chromatography media and 10 ml of eluent or sample in an integral reservoir. These columns are ideal for sample preparation and small-scale chromatography applications, including work with radioisotopes and other applications that require disposable products. Poly-Prep columns may be autoclaved and will retain fine particles.

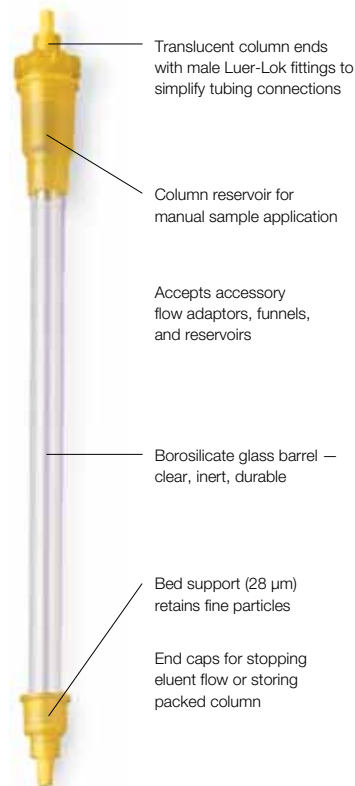
For More Information
Request or download bulletin: 2289



Glass Econo-Column® Columns

Order Info: Pg 73

Econo-Column chromatography columns are the standard for high-quality, affordable low-pressure chromatography columns. Columns ranging from 5 to 170 cm in length and 0.5 to 5.0 cm in diameter are available. A porous polymer bed support at the bottom of the column retains fine particles, and translucent polypropylene end fittings allow viewing of the entire column bed. Econo-Column chromatography columns can be autoclaved and are designed to operate at pressures <1 bar (14.7 psi). Econo-Column chromatography columns accept Econo-Column funnels as well as Econo-Column flow adaptors. Econo-Column chromatography columns are now packaged in quantities of 1, 2, and 4, depending on column diameter and length. For convenience, all packaging sizes now contain one stopcock per column ordered.



Jacketed Econo-Column® Columns

Order Info: Pg 74

Jacketed Econo-Column chromatography columns have an integral water jacket and are ideal for applications that require temperature control, such as thermal chromatography of DNA using hydroxyapatite. A porous polymer bed support at the bottom of the column retains fine particles, and translucent polypropylene end fittings allow viewing of the entire column bed. Jacketed Econo-Column chromatography columns accept Econo-Column funnels and flow adaptors.



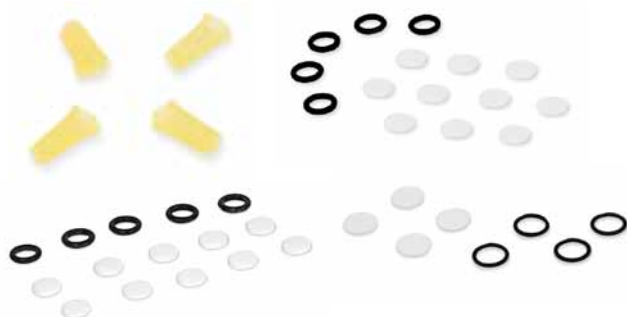
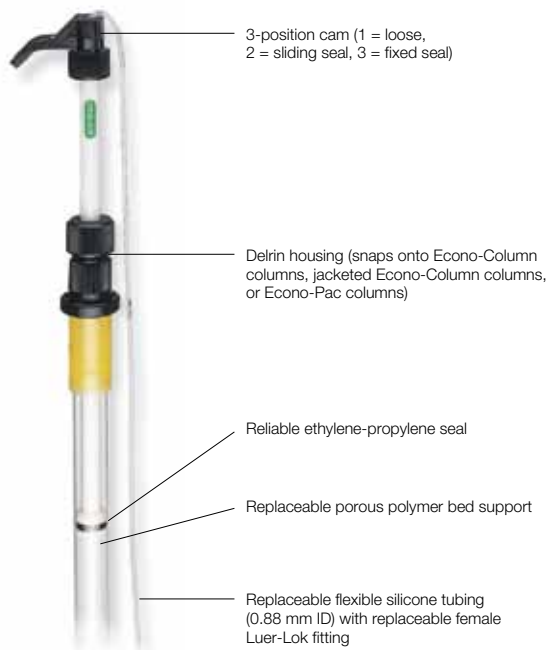
Econo-Column® Flow Adaptors

Order Info: Pg 75

Flow adaptors significantly improve column performance by eliminating head space above the gel bed and by protecting the column bed from disruption during sample loading.

Flow adaptors improve resolution by delivering buffer and sample directly to the top of the column bed. Flow adaptors are recommended for use with any low-pressure column connected to pumps, the BioLogic™ LP system, or other low-pressure systems.

Econo-Column flow adaptors are available for 1.0, 1.5, 2.5, and 5.0 cm ID Econo-Column chromatography columns (page 67), jacketed Econo-Column chromatography columns (above), and Econo-Pac® columns (page 66). Due to wear and tear of bed supports and O-rings, maintenance kits are available for standard upkeep of flow adaptors.



Econo-Column® Funnel

Order Info: Pg 75

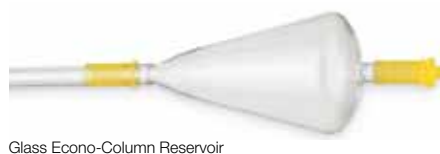
The Econo-Column funnel, constructed of durable polypropylene, is ideal for packing columns, loading diluted samples, or delivering large volumes of buffer. It forms a tight seal with Econo-Column chromatography columns up to 2.5 cm ID (page 67), jacketed Econo-Column chromatography columns (page 68), Poly-Prep® columns (page 67), and Econo-Pac® columns (page 66).



Glass Econo-Column® Reservoirs

Order Info: Pg 75

Reservoirs are available in 500 ml and 1 L capacities, and will fit 0.5, 0.7, 1.0, or 1.5 cm ID Econo-Column chromatography columns. To make a constant-pressure reservoir, close the reservoir top with a stopper that contains a piece of glass tubing extending into the reservoir. The removable upper cap has a male Luer-Lok fitting.

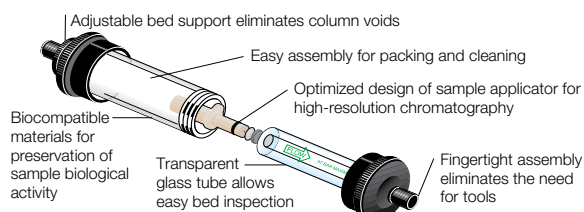


Bio-Scale™ MT High-Resolution Columns

Order Info: Pg 75

Bio-Scale MT empty columns can be packed with the media of your choice. These columns provide extremely high resolution in most chromatography applications. Bio-Scale MT columns allow precise sample application and provide the low dead volume required for high-resolution separations. The four column sizes (2, 5, 10, and 20 ml) allow easy scale-up of separation and purification protocols. The optimized design allows easy packing, bed height adjustment, sample application, and equilibration. Bio-Scale MT columns are convenient for use with BioLogic™ systems or any medium- or high-pressure chromatography system.

For More Information
Request or download bulletin: 1970



See Also

Bio-Scale CHT columns: page 64.
UNO columns: pages 64–65.
BioLogic DuoFlow systems: pages 77–84.
Bio-Scale Mini cartridges: page 62.

Chromatography Columns

Prepacked Chromatography Columns

Bio-Scale Mini Cartridges and Kits					Pg 62
Description	1 x 1 ml	5 x 1 ml	1 x 5 ml	5 x 5 ml	
Prepacked Bio-Scale Mini Cartridges					
UNOsphere Q Media	—	732-4100	732-4102	732-4104	
UNOsphere S Media	—	732-4110	732-4112	732-4114	
UNOsphere SUPrA rProtein A Media	732-4200	732-4201	732-4202	—	
UNOsphere Rapid S Media	—	732-4400	732-4401	732-4402	
Nuvia S Media	732-4420	732-4421	732-4422	732-4423	
Macro-Prep High Q Media	—	732-4120	732-4122	732-4124	
Macro-Prep High S Media	—	732-4130	732-4132	732-4134	
Macro-Prep DEAE Media	—	732-4140	732-4142	732-4144	
Affi-Prep Protein A Media	—	732-4600	732-4602	—	
Profinity IMAC Ni-Charged Resin	—	732-4610	732-4612	732-4614	
Profinity GST Resin	—	732-4620	732-4622	732-4624	
DEAE Affi-Gel Blue Media	—	—	732-4632	732-4634	
Affi-Gel Blue Media	—	—	732-4642	732-4644	
CHT Type I, 40 µm Media	—	—	732-4322	732-4324	
CHT Type II, 40 µm Media	—	—	732-4332	732-4334	
CFT Type II Media	—	—	732-4405	732-4406	
Description	Individual	Pack of 5			
Bio-Gel P-6 Media, 10 ml	—	732-5304			
Bio-Gel P-6 Media, 50 ml	732-5312	732-5314			
Catalog #	Description				
Bio-Scale Mini Cartridge Kits					
732-4407	Bio-Scale Mini Apatite Purification Cartridge Kit , includes one each, 5 ml, prepacked, CFT ceramic fluoroapatite Type II, 40 µm and CHT ceramic hydroxyapatite Type I, 40 µm multimodal chromatography media cartridges				
732-4408	Bio-Scale Mini mAb Purification Kit , UNOsphere SUPrA affinity cartridge, UNOsphere Q cartridge, CHT Type I, 40 µm cartridge, 1 x 5 ml each				
Adaptor Fittings					
732-0111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to a BioLogic LP or FPLC system				
732-0112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to a BioLogic DuoFlow or HPLC system				
732-0113	Luer to BioLogic System Fittings Kit , includes 1/4-28 female to male luer and 1/4-28 female to female luer to connect 1 cartridge to a BioLogic DuoFlow system				
Bio-Scale Mini Cartridge Protein Purification Sampler Packs					Pg 62
732-4650	Bio-Scale Mini Ion Exchange Sampler Pack , includes one each UNOsphere Q, UNOsphere S, Macro-Prep Q, Macro-Prep S, Macro-Prep DEAE 1 ml cartridges				
732-4651	Bio-Scale Mini Affinity Sampler Pack , includes one each IMAC, GST, Affi-Prep protein A 1 ml cartridges, and one each DEAE Affi-Gel Blue and Affi-Gel Blue 5 ml cartridges				
Adaptor Fittings					
732-0111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to a BioLogic LP or FPLC system				
732-0112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to a BioLogic DuoFlow or HPLC system				
Bio-Spin and Micro Bio-Spin Columns					Pg 63
732-6227	Bio-Spin 6 Columns , 25				
732-6228	Bio-Spin 6 Columns , 100				
732-6221	Micro Bio-Spin 6 Columns , 25				
732-6222	Micro Bio-Spin 6 Columns , 100				
732-6225	Micro Bio-Spin 6 Columns , 1,000				
732-6006	Bio-Spin 30 Columns , 25				
732-6216	Bio-Spin 30 Columns , 1,000				
732-6202	Micro Bio-Spin 30 Columns , 25				
732-6203	Micro Bio-Spin 30 Columns , 100				
732-6206	Micro Bio-Spin 30 Columns , 1,000				

Go to www.bio-rad.com/cartridges for current information on prepacked cartridges.

Catalog # Description

Mini Bio-Spin Columns

Pg 63

156-3007* **Profinity eXact Mini Spin Columns**, includes 10 (0.6 ml) spin columns, 2 ml capped tubes (10), and 2 ml capless tubes (10)

* For ProteoMiner mini spin columns, see page 11.

Poly-Prep Ion Exchange Columns

Pg 64

Catalog #	Description	Particle Size, μm	Ionic Form	Application
731-6211	Poly-Prep Columns , AG 1-X8 resin, 100–200 mesh, 50	106–180	Chloride	Separation of low molecular weight inorganic anions
731-6212	Poly-Prep Columns , AG 1-X8 resin, 200–400 mesh, 50	45–106	Chloride	For high-resolution random separations
731-6221	Poly-Prep Columns , AG 1-X8 resin, 200–400 mesh, 50	45–106	Formate	Separation of low molecular weight biological compounds such as nucleotides, peptides, and carboxylic acids
731-6213	Poly-Prep Columns , AG 50W-X8 resin, 100–200 mesh, 50	106–250	Hydrogen	Separation and concentration of low molecular weight cations such as small peptides and amino acids
731-6214	Poly-Prep Columns , AG 50W-X8 resin, 200–400 mesh, 50	63–150	Hydrogen	For high-resolution random separations
731-1555	Poly-Prep Column Stack Cap , 50			Allows connection of pumps, reservoirs, or columns in series

Bio-Scale CHT Type I Columns

Pg 64

Catalog #	Description	Dimensions, mm	Bed Volume, ml	Protein Capacity, mg	Flow Rate, ml/min	Pressure, psi
751-0021	Bio-Scale CHT2-I Column	7 x 52	2	20	0.5–3.0	1,000
751-0023	Bio-Scale CHT5-I Column	10 x 64	5	50	0.5–5.0	750
751-0025	Bio-Scale CHT10-I Column	12 x 88	10	100	0.5–7.0	600
751-0027	Bio-Scale CHT20-I Column	15 x 113	20	200	0.5–10.0	500

CHT-I Top Off Support Kit

751-0029 **CHT-I Top Off Support Kit**, includes 1 ml support frits, distribution screens for each column diameter

Fittings

750-0554 **1/16" OD (1.6 mm) Post-Pump Fittings**, includes Delrin nut, ferrules, lock ring, 10 sets

UNO Monolith Ion Exchange Columns

Pg 64

Catalog #	Description	Column Volume, ml	Recommended Max. Protein Load, mg/column	Recommended Flow Rate, ml/min	Column Dimensions (W x L), mm	Max. Operating Pressure		
						psi	MPa	bar
720-0001	UNO Q1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
720-0003	UNO Q6 Column	6	90	0.5–8.0	12 x 53	700	4.5	48
720-0005	UNO Q12 Column	12	180	0.5–8.0	15 x 68	700	4.5	48
720-0021	UNO S1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
720-0023	UNO S6 Column	6	90	0.5–8.0	12 x 53	700	4.5	48
720-0025	UNO S12 Column	12	180	0.5–8.0	15 x 68	700	4.5	48

UNO Replacement Columns

720-0011	UNO Q1R Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
720-0013	UNO Q6R Column	6	90	0.5–8.0	12 x 53	700	4.5	48
720-0015	UNO Q12R Column	12	180	0.5–8.0	15 x 68	700	4.5	48
720-0031	UNO SR1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
720-0033	UNO S6R Column	6	90	0.5–8.0	12 x 53	700	4.5	48
720-0035	UNO S12R Column	12	180	0.5–8.0	15 x 68	700	4.5	48

UNO Polishing PEEK Column

720-0009	UNO Q Polishing Column	0.16	2	0.1–1.0	4.6 x 10	200	1.3	14
720-0029	UNO S Polishing Column	0.16	2	0.1–1.0	4.6 x 10	200	1.3	14

Catalog # Description

Fittings

750-0554 **1/16" OD (1.6 mm) Post-Pump Fittings**, includes Delrin nut, ferrules, lock ring, 10 sets

750-0568 **UNO 10-32 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system

750-0567 **UNO M6 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system

Aminex HPLC Columns Pg 65

Catalog #	Description	Guard Column*	Applications	Particle Size, μm	Ionic Form	Cross-linkage %	pH Range
Carbohydrate Analysis Columns							
125-0143	Aminex HPX-87N Column , 300 x 7.8 mm	125-0508	Beet sugars	9	Sodium	8	5–9
125-0142	Aminex HPX-87K Column , 300 x 7.8 mm	125-0507	Molasses, corn syrup	9	Potassium	8	5–9
125-0095	Aminex HPX-87C Column , 300 x 7.8 mm	125-0128 or 125-0503	High fructose corn syrup	9	Calcium	8	5–9
125-0094	Aminex HPX-87C Column , 250 x 4.0 mm	125-0128 or 125-0503	Sugar alcohols (USP)	9	Calcium	8	5–9
125-0098	Aminex HPX-87P Column , 300 x 7.8 mm	125-0119 or 125-0118	Pentose sugars, cellulose hydrolysates	9	Lead	8	5–9
125-0140	Aminex HPX-87H Column , 300 x 7.8 mm	125-0129 or 125-0502	Sugars with organic acids	9	Hydrogen	8	1–3
125-0096	Aminex HPX-42C Column , 300 x 7.8 mm	125-0128 or 125-0503	Oligosaccharides, thickening agents	25	Calcium	4	5–9
125-0097	Aminex HPX-42A Column , 300 x 7.8 mm	125-0118	Oligosaccharides to D-11	25	Silver	4	6–8
125-0105	Fast Carbohydrate Column , 100 x 7.8 mm	125-0119 or 125-0118	Glucose, galactose, sucrose, fructose	9	Lead	8	5–9
Catalog #	Description	Guard Column*	Applications	Particle Size, μm	Ionic Form	Cross-linkage %	pH Range
Organic Acid and Alcohol Columns							
125-0140	Aminex HPX-87H Column , 300 x 7.8 mm	125-0129 or 125-0502	Sugars with organic acids, fermentation monitoring	9	Hydrogen	8	1–3
125-0100	Fast Acid Analysis Column , 100 x 7.8 mm	125-0129 or 125-0502	Alcohol, glycol, organic acid analysis	9	Hydrogen	8	1–3
125-0115	Fermentation Monitoring Column , 150 x 7.8 mm	125-0129 or 125-0502	Sugar, acids, alcohols	9	Hydrogen	8	1–3
Application Kits for Food Analysis**							
125-0233	Carbohydrate Analysis Kit	Included	Carbohydrates	9	Calcium	8	5–9
125-0234	Organic Acid Analysis Kit	Included	Organic acids	9	Hydrogen	8	1–3
Catalog #	Description	Guard Column For			Ionic Form	pH Range	
Micro-Guard Cartridges							
125-0118***	De-Ashing Refill Cartridges , 30 x 4.6 mm, 2	Aminex silver- and lead-form columns			H ⁺ and CO ₃ ⁻	6–8	
125-0119	Carbo-P Refill Cartridges , 30 x 4.6 mm, 2	Aminex HPX-87P column			Lead	5–9	
125-0128	Carbo-C Refill Cartridges , 30 x 4.6 mm, 2	Aminex calcium-form columns			Calcium	5–9	
125-0129	Cation H Refill Cartridges , 30 x 4.6 mm, 2	Aminex hydrogen-form columns			Hydrogen	1–3	
125-0502†	IG Cation H Cartridges , 30 x 4.6 mm, 2	Aminex hydrogen-form columns			Hydrogen	1–3	
125-0503†	IG Carbo-C Cartridges , 30 x 4.6 mm, 2	Aminex calcium-form columns			Calcium	5–9	
125-0506	Anion CO₃⁻ Cartridges , 30 x 4.6 mm, 2	Aminex silver- and lead-form columns			CO ₃ ⁻	—	
125-0507	Cation K⁺ Cartridges , 30 x 4.6 mm, 2	Aminex HPX-87K column			Potassium	5–9	
125-0508	Cation Na⁺ Cartridges , 30 x 4.6 mm, 2	Aminex HPX-87N column			Sodium	5–9	
Catalog #	Description						
Cartridge Holders and Accessories							
125-0131	Standard Cartridge Holder , for one 30 x 4.6 mm cartridge						
125-0147	Cartridge Holder Seal Replacement Kit , for 125-0131						
125-0148	Cartridge Holder Seals , for 125-0131						
125-0139	De-Ashing Cartridge Holder , for 125-0118, holds two 3.0 x 4.6 mm cartridges in series						

* Supplied as 2 guard columns.

** Includes 1 column and 2 Micro-Guard cartridges; requires standard cartridge holder, catalog #125-0131.

*** Requires de-ashing cartridge holder, catalog #125-0139.

† IG = industrial grade; larger particle size.

Catalog # Description

Econo-Pac Affinity and Desalting Columns Pg 65

732-2022	Econo-Pac Protein A Columns , prefilled with Affi-Gel protein A media, 5
732-2020	Econo-Pac Protein A Kit , 1 x 2 ml Affi-Gel protein A column, 1 x 10 ml 10DG column, buffers
732-2026	Econo-Pac Serum IgG Purification Column , prefilled with DEAE Affi-Gel Blue gel, 5
732-2027	Econo-Pac Serum IgG Purification Kit , 5 x 5 ml DEAE Affi-Gel Blue columns, 5 x 10 ml 10DG columns, buffers
732-2010	Econo-Pac 10DG Desalting Columns , 30
738-0019	Econo-Pac Flow Adaptor , 1.5 cm column ID

Empty Columns

Bio-Spin, Micro Bio-Spin, and Mini Bio-Spin Columns Pg 66

732-6008	Bio-Spin Chromatography Columns , empty, 100
732-6025	Bio-Spin Chromatography Columns , empty, 1,000
732-6204	Micro Bio-Spin Chromatography Columns , empty, 100
732-6207	Mini Bio-Spin Chromatography Columns , empty, 100
731-1660	End Caps , for Micro Bio-Spin chromatography columns, 1,000

Econo-Pac Columns Pg 66

732-1010	Econo-Pac Chromatography Columns , empty, includes upper bed supports, end caps, tip closures, 50
732-1011	Econo-Pac Chromatography Columns , empty, includes upper bed supports, end caps, tip closures, 500

Accessories

738-0019	Econo-Pac Flow Adaptor , 1.5 cm column ID
731-7005	Poly Column Rack , 20-place, with removable tube rack
732-8102	2-Way Stopcocks , female luer to male luer, 10
731-8232	Female Luer Plugs , 25, polypropylene
731-1660	End Caps , for Econo-Pac columns, 1,000

Poly-Prep Columns Pg 67

731-1550	Poly-Prep Chromatography Columns , empty, includes end caps and tip closures, 50
731-1553	Poly-Prep Chromatography Columns , empty, includes end caps and tip closures, 1,000

Accessories

731-1555	Poly-Prep Column Stack Cap , 50
731-7005	Poly Column Rack , 20-place, with removable tube rack
732-8102	2-Way Stopcocks , female luer to male luer, 10
731-8232	Female Luer Plugs , 25, polypropylene
731-1660	End Caps , for disposable plastic columns, 1,000

Glass Econo-Column Columns* Pg 67

Catalog #	ID, cm	Length, cm	Cross-Sectional Area, cm ²	Maximum Volume, ml	Columns/Pkg
737-0507	0.5	5	0.20	1	2
737-0512	0.5	10	0.20	2	2
737-0517	0.5	15	0.20	3	2
737-0522	0.5	20	0.20	4	2
737-0707	0.7	5	0.39	2	2
737-0712	0.7	10	0.39	4	2
737-0717	0.7	15	0.39	6	2
737-0722	0.7	20	0.39	8	2
737-0732	0.7	30	0.39	12	2
737-0752	0.7	50	0.39	20	2
737-4506	0.5	5	0.20	1	4
737-4511	0.5	10	0.20	2	4
737-4516	0.5	15	0.20	3	4
737-4521	0.5	20	0.20	4	4
737-4706	0.7	5	0.39	2	4
737-4711	0.7	10	0.39	4	4
737-4716	0.7	15	0.39	6	4
737-4721	0.7	20	0.39	8	4
737-4731	0.7	30	0.39	12	4
737-4751	0.7	50	0.39	20	4
737-4006	1.0	5	0.79	4	4
737-1007	1.0	5	0.79	4	2
737-4011	1.0	10	0.79	8	4

continues

Glass Econo-Column Columns* (cont.)

Pg 67

Catalog #	ID, cm	Length, cm	Cross-Sectional Area, cm ²	Maximum Volume, ml	Columns/Pkg
737-1012	1.0	10	0.79	8	2
737-4021	1.0	20	0.79	16	4
737-1022	1.0	20	0.79	16	2
737-4031	1.0	30	0.79	24	4
737-1032	1.0	30	0.79	24	2
737-4051	1.0	50	0.79	40	4
737-1052	1.0	50	0.79	40	2
737-1091	1.0	100	0.79	79	2
737-1093	1.0	120	0.79	103	2
737-4150	1.5	5	1.77	9	4
737-1507	1.5	5	1.77	9	2
737-4151	1.5	10	1.77	18	4
737-1512	1.5	10	1.77	18	2
737-4156	1.5	15	1.77	27	4
737-1517	1.5	15	1.77	27	2
737-4152	1.5	20	1.77	35	4
737-1522	1.5	20	1.77	35	2
737-4153	1.5	30	1.77	53	4
737-1532	1.5	30	1.77	53	2
737-4155	1.5	50	1.77	89	4
737-1552	1.5	50	1.77	89	2
737-1576	1.5	75	1.77	124	2
737-1591	1.5	100	1.77	177	2
737-1593	1.5	120	1.77	230	2
737-1598	1.5	170	1.77	301	2
737-4250	2.5	5	4.91	25	4
737-2507	2.5	5	4.91	25	2
737-4251	2.5	10	4.91	49	4
737-2512	2.5	10	4.91	49	2
737-4252	2.5	20	4.91	98	4
737-2522	2.5	20	4.91	98	2
737-4253	2.5	30	4.91	147	4
737-2532	2.5	30	4.91	147	2
737-2551	2.5	50	4.91	246	2
737-2576	2.5	75	4.91	344	2
737-2591	2.5	100	4.91	491	2
737-2593	2.5	120	4.91	589	2
737-5011	5.0	10	19.63	196	1
737-5021	5.0	20	19.63	393	1
737-5031	5.0	30	19.63	589	1
737-5051	5.0	50	19.63	982	1
737-5071	5.0	70	19.63	1,374	1

Catalog # Description

Econo-Column Selection Packs

737-6601 **Econo-Column Selection Pack A**, includes 7 columns, 1 each of 0.7 x 10, 20, and 30 cm; 1.5 x 30 and 50 cm; 2.5 x 20 and 50 cm

737-6607 **Econo-Column Selection Pack B**, includes 6 columns, 1 each of 1.0 x 20, 30, and 50 cm; 1.5 x 20, 30, and 50 cm

* For fittings, see low-pressure fittings on pages 87 and 101.

Jacketed Econo-Column Columns

Pg 68

Catalog #	Description	ID, cm	Length, cm	Cross-Sectional Area, cm ²	Maximum Volume, ml	Columns/Pkg
737-6108	Econo-Column Jacketed Column	0.7	15	0.37	6	1
737-6116	Econo-Column Jacketed Column	1.0	15	0.79	12	1
737-6131	Econo-Column Jacketed Column	1.0	30	0.79	25	1
737-6151	Econo-Column Jacketed Column	1.5	50	1.77	89	1
737-6201	Econo-Column Open-Ended Jacketed Column	1.0	30	0.79	25	1

Catalog # Description

Econo-Column Flow Adaptors

Pg 68

Flow Adaptors

738-0014	Flow Adaptor , 1.0 cm column ID, 1–7 cm functional length
738-0015	Flow Adaptor , 1.0 cm column ID, 1–14 cm functional length
738-0016	Flow Adaptor , 1.5 cm column ID, 1–14 cm functional length
738-0017	Flow Adaptor , 2.5 cm column ID, 1–14 cm functional length
738-0018	Flow Adaptor , 5.0 cm column ID, 1–14 cm functional length (does not include cam mechanism)
738-0019	Econo-Pac Flow Adaptor , 1.5 cm column ID

Flow Adaptor Maintenance Kits

738-0022	Flow Adaptor Maintenance Kit , for 5.0 cm flow adaptor, includes 2 bed supports and 2 O-rings
738-0024	Flow Adaptor Maintenance Kit , for 1.0 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings
738-0025	Flow Adaptor Maintenance Kit , for 1.5 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings
738-0027	Flow Adaptor Maintenance Kit , for 2.5 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings

Econo-Column Funnel

Pg 69

731-0003	Econo-Column Funnels , 250 ml, 5
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Glass Econo-Column Reservoirs

Pg 69

737-9112	Econo-Column Reservoir , 500 ml
737-9113	Econo-Column Reservoir , 1 L

Bio-Scale MT High Resolution Columns

Pg 69

Catalog #	Description	Column Volume, ml	Pressure Limit, psi
Bio-Scale Columns*			
751-0081	Bio-Scale MT2 Column , 7 x 52 mm	1.9–2.3	1,000
751-0083	Bio-Scale MT5 Column , 10 x 64 mm	4.6–5.7	750
751-0085	Bio-Scale MT10 Column , 12 x 88 mm	9.5–11.3	600
751-0087	Bio-Scale MT20 Column , 15 x 113 mm	19.4–21.9	500

Catalog # Description

Kits and Fittings

751-0091	Bio-Scale 2 Replacement Parts Kit , includes 5 frits, 5 distribution screens, 2 O-rings, 1 frit remover
751-0093	Bio-Scale 5 Replacement Parts Kit
751-0095	Bio-Scale 10 Replacement Parts Kit
751-0097	Bio-Scale 20 Replacement Parts Kit
750-0554	1/16" OD (1.6 mm) Post-Pump Fittings , includes Delrin nut, ferrules, lock ring, 10 sets
750-0567	UNO M6 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system
750-0568	UNO 10-32 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system

* Each Bio-Scale MT column comes with a Bio-Scale replacement parts kit.