Resins & Media

Resins
Rezorian and Porozorb Cartridges

P000619

Rezorian A161 Cartridges

Disposable Rezorian A161 Luer lock syringe-tip cartridges offer convenience and expedience for isolating, purifying, and concentrating biomolecules from aqueous samples. Packed with high performance, macroreticular, hydrophobic adsorbent resin (Table 1), Rezorian A161 cartridges are specially tailored for biomolecular pharmaceutical separations. We can custom prepare Rezorian cartridges with a variety of resins - please inquire.

TABLE 1. RESIN CHARACTERISTICS: REZORIAN CARTRIDGES

Particle Description:	spherical styrene divinylbenzene, reagent grade
Mean Particle Size:	120µm
Mean Pore Diameter:	110-175Å
Surface Area:	800-950m²/g

DESCRIPTION	QTY.	CAT. NO.	PRICE
Rezorian A161 Cartridges, 1mL	6	57610-U	
Rezorian A161 Cartridges, 5mL	6	57611	

RELATED INFORMATION

For additional information, request the following free literature by phone or fax, or see our website.

No.	Subject
T111871	Porozorb cartridges (purifying biological preparations)
T494015	Rezorian cartridges
T394001	Rezorian cartridges (concentrating ethidium bromide)
T394022	Rezorian cartridges (concentrating ethidium bromide)

P000620

Sterile Porozorb Cartridges

Analysts processing protein or other biological preparations, sterile pharmaceuticals, foods, or beverages must separate wanted products from unwanted process components. Produced using validated processes, Porozorb cartridges are sterile, endotoxin-free, ready-to-use adsorbent cartridges that effectively remove detergents (Triton X-100, sodium dodecyl sulfate, Tween, etc.) or other nonpolar, hydrophobic materials from such preparations. They are appropriate for analytical scale to process scale purification schemes.

A certificate of analysis accompanies each Porozorb cartridge. Cartridges are tested for Sterility and Endotoxin by an accredited test lab following modified USP guidelines. The cartridges can be rinsed with cleaning agents (e.g., most weak acids and bases) or autoclaved at 121°C. The polycarbonate cartridge can accept 50% organic solutions during analysis, but must be stored in aqueous solutions.

CHARACTERISTICS OF POROZORB CARTRIDGES	
Particle Description:	spherical styrene/divinylbenzene, cleaned
Mean Particle Size:	500µm
Mean Pore Diameter:	40Å
Cartridge Dimensions: [1]	6.55 x 8cm (250mL) 26.20 x 8cm (1000mL) 42.04cm x 12.71cm (4000mL)
Nipple Connections:	3/16" ID, 1/4" OD
Shell:	clear polycarbonate
Retaining Screens:	stainless steel, 50x250 mesh, highest quality
Gaskets:	Melrath medical grade
Maximum Pressure:	30psi (2.1kg/cm²)
Sterility:	shipped sterile and endotoxin-free

[1] We can make other Porozorb cartridges on request.

CARTRIDGE	VOLUME	CAT. NO.	PRICE
POROZORB CARTIDGES			
Porozorb 254	250mL	57500	
Porozorb 1004	1000mL	57502	
Porozorb 4004	4000mL	57513-U	

NOTE: Porozorb cartridges are not for clinical or diagnostic use.

Due to shelf life limitations, Porozorb cartridges are made on receipt of an order. Expect 2-4 week delivery times.

See Legally Speaking in the index.

Activated Alumina

Highly porous in nature, aluminas can be effective desiccants and have numerous applications in catalysis. We offer four types of activated alumina (Al_2O_3) designed for column chromatography: acidic, weakly acidic, basic, and neutral. All grades have a Brockmann activity of I. Prepare Brockmann II-V grades simply by adding the appropriate amount of water to the Brockmann I grade. Shake the material well to disintegrate lumps and allow it to equilibrate in a closed vessel overnight.

Activated Alumina

Applications

- Neutral alumina can be used for removing impurities from natural alkaloids, vitamins, antibiotics, glycosides, and synthetic hormones, and for drying and purifying solvents.
- Basic alumina can be used for removing peroxides from ethers and hydrocarbons, extracting polar compounds (such as alcohols), drying solvents (diethylether, benzene, chloroform), separating xylenes, or in dioxin analyses (EPA Method 161[1]) or pesticide analyses.
- Acidic alumina is useful for adsorbing polar compounds (such as vitamins), inorganic cations, water-soluble dyes, morphine, fatty acids, plant waxes, and in dioxin analyses (EPA Method 161[1]).

TYPICAL PARTICLE SIZE DISTRIBUTION FOR ACTIVATED ALUMINA (ALL GRADES)		
Sieve Opening (mm)	Mesh Size	% Retained
0.25	60	≤0.1
0.20	~75	2-5
0.15	100	15-20
0.10	~150	55-65
0.07	~210	72-85
0.04	~360	95-98

AMOUNT OF WATER TO BE ADDED TO BROCKMANN I GRADE		APPROX. WATER CONTENT (%, KARL FISCHER METHOD)
For grade II:	3%	4 - 4.5
For grade III:	6%	7 - 7.5
For grade IV:	10%	11 - 11.5
For grade V:	15%	16 - 16.5

CHARACTERISTICS OF STANDARD GRADES OF ACTIVATED ALUMINA (BROCKMANN NO. 1)	
Particle Size (mesh):	~150
Pore Diameter (Å):	58
Surface Area (m^2/g):	155
Water (%):	~1.5
Na_2O (%):	0.4
Fe_2O_3 (% max.):	0.02
SiO_2 (% max.):	0.02

CAT. NO.	GRADE	TYPE	pH	Cl^- (meq/g)
199974	507-C-I	neutral	7.5±0.5	0.03
199443	5016-A-I	basic	9.5±0.5	—
199966	504-C-I	acidic	4.5±0.5	0.14
267740	506-C-I	weakly acidic	6.0±0.5	0.06

[1] 5% stirred aqueous suspension.

TYPE	WEIGHT	CAT. NO.	PRICE
Neutral	5g	199974-5G	
	100g	199974-100G	
	1000g	199974-1KG	
	5000g	199974-5KG	
Basic	5g	199443-5G	
	100g	199443-100G	
	1000g	199443-1KG	
	5000g	199443-5KG	
Acidic	100g	199966-100G	
	1000g	199966-1KG	
	5000g	199966-5KG	
Weakly acidic	250g	267740-250G	
	1000g	267740-1KG	
	5000g	267740-5KG	

Celite Filter Aid

Reagent-grade Celite 545 AW. Acid-washed, high-purity flux-calcined diatomaceous silica, especially prepared for chromatography and other laboratory applications.

DESCRIPTION	QTY.	CAT. NO.	PRICE
Celite 545 AW	454g	20199-U	

HELPFUL HINTS

For aluminas in solid phase extraction tubes refer to the Sample Preparation section of this catalog.

Resins
Adsorption Media

Ambersorb: High Performance Separations

Ambersorb synthetic carbonaceous adsorbents can be used in a diverse range of liquid or vapor phase separation applications, including:

- Wastewater treatment
- High value separations
- Vapor phase treatment of toxic air emissions
- Catalysts/catalyst supports
- Ultrapure water preparation

Ambersorb adsorbents are available from Supelco in research-scale quantities, up to 1000g.

Unique physical structure makes Ambersorb resins ideal for bulk-scale separation applications:

- High macro- and mesoporosity allows fast mass transfer of a compound to the micropores
- Unique pore size distribution and surface chemistry provide excellent adsorption capacity
- Easy regeneration in situ
- Excellent physical integrity eliminates concern about dusting or attrition

Ambersorb Carbonaceous Adsorbents

DESCRIPTION	QTY.	CAT. NO.	PRICE
Ambersorb 563	100g	10430-U	
Ambersorb 572	100g	10432-U	

Combigel XE-305

Underivatized polystyrene, mesh size 50-100 – our answer to Amberlite XE-305. Unique swelling properties; combinatorial chemistry support.

See our combinatorial chemistry reaction vessels, vacuum manifolds, and accessories in the Sample Preparation section.

DESCRIPTION	CAT. NO.	PRICE
COMBIGEL XE-305		
50g	502537B	

Lipophilic Sephadex

Lipophilic Sephadex LH-20 is a hydroxypropylated derivative of Sephadex G-25. It is used in gel permeation, normal phase partition, and adsorption chromatography of, e.g., lipids, steroids, fatty acids, hormones, and vitamins. It also is used for adsorption chromatography.

Dry Bead Diameter: 25-100µm
Swelling Ratio: 1g swells to approx. 4mL (water, methanol)
pH Range: 2-13
Storage: room temp.

DESCRIPTION	CAT. NO.	PRICE
LIPOPHILIC SEPHADEX		
10g	LH20100-10G	
50g	LH20100-50G	
100g	LH20100-100G	
500g	LH20100-500G	

TABLE 1. AMBERSORB 563 ADSORBENT HAS HIGH CAPACITY FOR DICHLOROMETHANE — UNDER DRY OR HUMID CONDITIONS

Kinetic Saturation Capacity					
Dry Air		90% Relative Humidity		Preconditioned 90% Relative Humidity	
mg/g	mg/mL	mg/g	mg/mL	mg/g	mg/mL
83 ± 18	48 ± 14	52 ± 5	30 ± 4	43 ± 4	27 ± 2

TABLE 2. TYPICAL PROPERTIES OF AMBERSORB CARBONACEOUS ADSORBENTS

Adsorbent	Hydrophobicity [1]	Surface Area (m^2/g)	Porosity (mL/g) Micropores <20Å	Mesopores 20-500Å	Macropores >500Å	Bulk Density (g/cc)	Ash (%)	Water Adsorption [2] (g/g)	Mesh Size
Ambersorb 563	high	550	0.23	0.14	0.23	0.53	<0.05	0.12	20-50
Ambersorb 572	low	1100	0.41	0.19	0.24	0.49	<0.05	0.31	20-50

[1] Based on adsorption of trichloroethylene from water.
[2] Isotherm at 94% relative humidity.

Florisil: Magnesium Silicate Adsorbents

Florisil adsorbents are used in preparative and analytical chromatography, and are available in pesticide-residue (PR) and standard grades, in powdered and hard granular forms. All grades have a surface area of 300 m^2/g, pH=8.5 and have been activated.

PR grade 60/100 Florisil is specially tested for separating chlorinated pesticides, as described by Mills (1,2). It gives consistent results for column cleanup and separation of chlorinated pesticide residues, prior to gas or thin layer chromatography. Each batch is tested to meet performance characteristics described in Changes of Official Methods of Analysis, JAOAC, Chapter 24, 208(h), Vol 49, p 233, 1966. Packaged in glass containers.

Applications

- Isolation of steroids, sex hormones, and related compounds
- Isolation of antibiotics and alkaloids
- Lipid separation
- Vitamin assay
- Purification of pharmaceuticals
- Separation of nitrogen compounds from hydrocarbons
- Separation of aliphatic/aromatic mixtures
- Liquid partition chromatography
- Decolorization
- Catalysis
- Sample cleanup for PCBs and pesticides analysis

Sample Handling

The US Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) method for monitoring pesticides in water, sediment, and soil samples from hazardous waste sites specifies use of Florisil solid phase extraction (SPE) cartridges without glass wool or Teflon frits for sample cleanup. This mandatory cleanup procedure significantly reduces matrix interferences caused by polar compounds. Our ENVI-Florisil SPE tubes fulfill the pesticide recovery requirements of the EPA CLP pesticide method. A 6mL Supelclean LC-Florisil SPE tube allows quantification of PCBs in transformer oil at concentrations of 5 to 500ppm. Also available are ORBO-60 tubes, which meet NIOSH 5503 requirements for monitoring airborne PCBs. For more information, request T394028.

Florisil Adsorbents

GRADE	FORM	MESH SIZE	PARTICLE SIZE (µm)	QTY.	CAT. NO.	PRIC
Standard	Granular	16-30	595-1190	100g 500g	343994-100G 343994-500G	
Standard	Granular	30-60	250-595	250g 1000g	288691-250G 288691-1KG	
PR	Coarse powder	60-100	149-250	900mL	20280-U	
Standard	Coarse powder	60-100	149-250	250g 1000g	220744-250G 220744-1KG	
Standard	Fine powder	100-200	74-149	454g	20281	
Standard	Fine powder	<200	<74	250g 1000g	288705-250G 288705-1KG	

RELATED INFORMATION

Mills, P.A., J. Assoc. Off. Anal. Chem. 42: 734 (1959).
Mills, P.A., J. Assoc. Off. Anal. Chem. 44: 171 (1961).
References not available from Supelco.

HELPFUL HINTS

For Florisil adsorbent in solid phase extraction tubes refer to the Sampling Preparation section of this catalog.

Resins
Adsorption Media

Supelco offers a comprehensive range of silica gels, including Davisil and E. Merck products. These materials are useful for all types of low pressure, medium pressure, and flash column chromatography. They can be applied to the cleanup and purification of a wide range of synthetic and natural compounds.

The Aldrich Catalog/Handbook (available on request) lists a wide selection of silica gels and silicic acids for non-chromatographic purposes.

Davisil Silica

Davisil silica gels are available in various particle and pore sizes for preparative column chromatography. They have been processed to minimize or eliminate impurities such as minor metallic oxides, which can modify the surface nature and unpredictably affect adsorption processes.

- Davisil 923 silica meets ASTM D-1319-70 specifications for hydrocarbon analysis. Low metal oxides content minimizes olefin polymerization.
- Davisil 12 silica is recommended for ASTM Method D-2007 (rubber extender/processing oils).

PHYSICAL CHARACTERISTICS OF DAVISIL SILICA GELS

Pore Diameter (Å)	Surface Area (m^2/g)	Pore Volume (mL/g)	pH (5% slurry)
22	800	0.43	3.8
30	550	0.43	5.5
60	500	0.75	6.5
150	300	1.10	7.0
300	150-170	1.1-1.2	7.0
500	75-85	1.1-1.2	7.0

TYPICAL ELEMENTAL ANALYSIS FOR DAVISIL SILICAS:

Na (as Na_2O):	600ppm
Fe (as Fe_2O_3):	<100ppm
C:	<100ppm
heavy metals:	<5ppm

Davisil Silica Gels

GRADE	MESH SIZE	PARTICLE SIZE (µm)	PORE SIZE (Å)	QTY.	CAT. NO.	PRI
12	28-200	75-650	22	250g 1kg 5kg	214396-250G 214396-1KG 214396-5KG	
62	60-200	75-250	150	100g 500g 2.5kg	243981-100G 243981-500G 243981-2.5KG	
633	200-425	35-75	60	100g 1kg 10kg	236772-100G 236772-1KG 236772-10KG	
634	100-200	75-150	60	100g 1kg 10kg	236780-100G 236780-1KG 236780-10KG	
635	60-100	150-250	60	100g 1kg 10kg	236799-100G 236799-1KG 236799-10KG	
636	35-60	250-500	60	100g 1kg	236802-100G 236802-1KG	
643	200-425	35-70	150	100g 1kg	236810-100G 236810-1KG	
644	100-200	75-150	150	100g 1kg	236829-100G 236829-1KG	
645	60-100	150-250	150	100g 1kg	236837-100G 236837-1KG	
646	35-60	250-500	150	100g 1kg	236845-100G 236845-1KG	
653XWP	230-400	35-70	300	100g	13660	
663XWP	230-400	35-70	500	100g	13662	
923	100-200	75-150	30	250g 1kg	214477-250G 214477-1KG	

E. Merck Silica Gel

Merck silica gel 40, silica gel 60, and silica gel 100 are widely used for column chromatography. They are very pure, containing less than 0.02% iron and less than 0.02% chloride. Silica gel 60 (extra pure) contains less than 0.0005% each of Cd, Cu, Pb, Hg^{2+}, Pd and Zn, and <0.008% Cl, <0.002% Fe, <0.004% NO_3, and <0.003% SO_4^{2-}. Merck silica number 9385 is widely used for purification of organic synthesis products by gas-pressurized liquid chromatography.

DESCRIPTION	E. MERCK NUMBER	PARTICLE SIZE (µm)	SURFACE AREA (m^2/g)	PORE SIZE (Å)	pH (±0.5)	QTY.	CAT. NO.	PRICE
Silica gel 40	10180	63-200	750	40	5.5	100g 1kg 5kg	403563-100G 403563-1KG 403563-5KG	
Silica gel 40	10181	200-500	750	40	5.5	100g 500g 2kg	242179-100G 242179-500G 242179-2KG	
Silica gel 60	15111	15-40	550	60	7.0	50g 100g 1kg	S9258-50G S9258-100G S9258-1KG	
Silica gel 60	9385	40-63	550	60	7.0	100g 1kg 5kg 25kg	227196-100G 227196-1KG 227196-5KG 227196-25KG	
Silica gel 60	7734	63-200	550	60	7.0	100g 1kg 5kg	391484-100G 391484-1KG 391484-5KG	
Silica gel 60 (extra pure)	7754	63-200	550	60	7.0	25g 100g 500g	403598-25G 403598-100G 403598-500G	
Silica gel 100	10184	63-200	300	100	7.0-7.5	100g 1kg 5kg	403601-100G 403601-1KG 403601-5KG	

Modified Silica Gels

Chemically bonding organosilanes to silica dramatically alters the surface polarity, producing chromatographic media with separation properties complementary to "bare" silica. Characteristics in the table below represent nominal values for base silica. SUPELCOSIL A is a cleaned, sized, and activated irregular-particle silica gel for clean-up of synthetic organic reaction mixtures, dioxin (US EPA Method 1613), and other extraction procedures. It also is suitable for analyses of amino acids, aromatic hydrocarbons, peroxide acids, and steroids, fatty acids and lipids.

Sigma-Aldrich and Supelco Bonded Phase Silicas

DESCRIPTION	PARTICLE SIZE (µm)	SURFACE AREA (m^2/g)	PORE SIZE (Å)	QTY.	CAT. NO.	PRICE
3-Aminopropyl	40-63	550	60	10g 50g	364258-10G 364258-50G	
3-Chloropropyl	40-63	550	60	10g 50g	364266-10G 364266-50G	
Octyl	40-63	550	60	5g 25g	385441-5G 385441-25G	
Octadecyl	40-63	550	60	25g 100g	377635-25G 377635-100G	
SUPELCOSIL A (100-200 mesh)	75-150	500	60	100g 500g	13650-U 13651-U	
Supelprep ABZ Plus[1]	12	190-210	110-130	100g	54350-U	

[1] A highly deactivated reversed phase material that possesses an embedded polar (amide) group.

Resins
Adsorption Media

Polymeric Adsorbent Resins — Summary of Characteristics

RESIN	CHEMICAL NATURE	APPROX. PORE VOLUME (mL/g)	TRUE WET DENSITY (g/mL)	SKELETAL DENSITY (g/mL)	MEAN SURFACE AREA (m^2/g)	MEAN PORE DIAM. (Å)	MESH SIZE	SWELLING IN TOLUENE (%)
AMBERLITE/AMBERCHROM ADSORBENTS								
XAD-2	polyaromatic	0.65	1.02	1.08	300	90	20-60	—
XAD-4	polyaromatic	0.98	1.02	1.08	725	40	20-60	—
XAD-7HP	acrylic ester	1.14	1.05	1.24	450	90	20-60	—
XAD-16	polyaromatic	1.82	1.02	1.08	800	100	20-60	—
XAD-16HP	polyaromatic	1.82	1.02	1.08	800	100	20-60	—
XAD-1180	polyaromatic	1.68	1.01	1.04	500	300	20-60	—
CG-71m[1]	polymethacrylate	1.17	—	1.28	500	250	50-100µm	—
CG-71c[1]	polymethacrylate	1.17	—	1.28	500	250	80-160µm	—
CG-161m[1]	polyaromatic	1.45	—	1.08	900	150	50-100µm	—
CG-161c[1]	polyaromatic	1.45	—	1.08	900	150	80-160µm	—
CG-300s[1]	polyaromatic	1.66	—	1.08	700	300	20-50µm	—
CG-300m[1]	polyaromatic	1.66	—	1.08	700	300	50-100µm	—
CG-300c[1]	polyaromatic	1.66	—	1.08	700	300	80-160µm	—
CG-1000s[1]	polyaromatic	1.66	—	1.08	250	1000	20-50µm	—
DIAION/MCI GEL/SEPABEADS ADSORBENTS								
Relite EXC04	sulfonated copolymer	0.60	—	—	200	—	20-50	—
HP20	polyaromatic	1.30	1.01	—	500	260	20-60	30[4]
HP20S	polyaromatic	1.30	1.01	—	500	260	150-300µm	30[4]
HP20SS	polyaromatic	1.30	1.01	—	500	260	75-150µm	30[4]
SP20SS	polyaromatic	1.30	1.01	—	500	260	50-100µm	30[4]
SP70	polyaromatic	1.10	1.01	—	700	65	250-850µm	—
SP825L	polyaromatic	1.40	1.01	—	1000	90-125	20-60	19[5]
SP850	polyaromatic	1.20	1.01	—	1000	38	20-60	19[5]
HP2MG	polymethacrylate	1.20	1.09	—	500	170	25-50	5
SP207	brominated styrenic	1.10	1.18	—	650	105	20-60	18[6]
CHP20P[2]	polyaromatic	1.30	1.01	—	500	400-600	75-150µm	—
DOWEX ADSORBENTS								
Styrene-DVB	polyaromatic[3]	—	—	—	—	—	18-100	—
Styrene-DVB	polyaromatic[3]	—	—	—	—	—	18-50	—
L-285	functionalized	—	—	1.04	800	25	20-50	—
L-323	polyaromatic	1.18	—	1.04	650	100	16-50	—
L-493	polyaromatic	1.16	—	—	1100	46	20-50	—
V-493	polyaromatic	1.16	—	—	1100	46	20-50	—
V-502	polyaromatic	0.94	—	0.40	1080	34	1500µm	—
SD-2	aminated copolymer	—	—	—	800	50	18-50	—
DUOLITE ADSORBENTS								
XAD-761	methylol	0.43	1.11	1.24	300	600	16-50	—
SUPELITE AND SUPELPAK ADSORBENTS								
Supelite DAX-8	acrylic ester	0.79	1.09	1.23	160	225	40-60	—
Supelpak-2	polyaromatic	0.65	1.02	1.07	300	90	20-60	—
Supelpak-2B	polyaromatic	0.65	1.02	1.07	300	90	20-60	—

[1] Amberchrom resin (suspension in 20% ethanol in water)
[2] MCI GEL resin
[3] Physical parameters in this table do not apply to these nonfunctionalized copolymer materials.
[4] In methanol 26%; in acetone 32%.
[5] In methanol 16%; in acetone 15%; in isopropanol 17%; in butyl acetate 17%.
[6] In methanol 15%; in acetone 15%; in isopropanol 17%; in butyl acetate 18%.

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Adsorbent Resins

DESCRIPTION	QTY.	CAT. NO.	PRICE
AMBERLITE RESINS			
Amberlite XAD-2 Polyaromatic Applications: Hydrophobic compounds up to 20,000 MW; phenol, organic removal; surfactants; aroma compounds; catalyst; metals; antibiotic recovery. For clean US EPA versions see Supelpak-2 and -2B.	100g 500g	20275 10357	
Amberlite XAD-4 Polyaromatic Applications: Small hydrophobic compounds; surfactants; pharmaceutical manufacturing; phenol, chlorinated organics, pesticide removal and recovery; organic removal from aqueous food streams.	100g 500g	20276 10358	
Amberlite XAD-7HP High performance version of XAD-7 (no longer available) Acrylic ester (moderate polarity) Applications: Compounds up to 60,000 MW; insulin recovery; fulvic and humic compounds; dry waste; organic removal and recovery; antibiotic recovery.	100g 500g	13361-U 13362-U	
Amberlite XAD-8 See Supelite DAX-8.			
Amberlite XAD-16 Polyaromatic Applications: Hydrophobic compounds up to 40,000 MW; antibiotics; pharmaceutical manufacturing; surfactants; bitters; separation of large organic molecules (especially proteins). More efficient than XAD-2.	100g 500g	10347 10345	
Amberlite XAD-16HP Same as XAD-16, but specially cleaned to meet FDA 21 CFR 173.65 for removal of organic substances from aqueous foods, except carbonated beverages. Meets requirements of FDA Food Additive Regulation 21 CFR 173.25.	100g 1000g	13355-U 13357-U	
Amberlite XAD-1180 Polyaromatic (less polar than XAD-4) Applications: Hydrophobic compounds; gallium; myxovirescins; phosphoric acid; riboflavin salts; antibiotic, vitamin, amino acid, and enzyme purification.	100g 500g	10377 10378	
AMBERCHROM RESINS			
Amberchrom CG-71 Polymethacrylate (moderate polarity) Applications: Amino acid separations (e.g., aspartame from phenylalanine); insulin recovery; peptides; aromatics.	m 100mL c 100mL	10367 10366	
Amberchrom CG-161 Polyaromatic Applications: Hydrophobic compounds; organics (e.g., phenol); surfactants; ethidium bromide; antibiotics; peptide and amino acid separations; small proteins.	m 100mL c 100mL	10369 10370-U	
Amberchrom CG-300 Polyaromatic Applications: Hydrophobic compounds; surfactants; medium-sized proteins; large peptides; antibiotics.	s 100mL m 100mL c 100mL	13908 13909-U 13910-U	

DESCRIPTION	QTY.	CAT. NO.	PRICE
AMBERCHROM RESINS(CONT'D)			
Amberchrom CG-1000 Polyaromatic Applications: Hydrophobic compounds; bulky surfactants; large proteins; antibiotics.	s 100mL	13911	
DIAION/SEPABEADS RESINS (MITSUBISHI)			
HP20 Polyaromatic Particle Size: 250-850µm Applications : Hydrophobic compounds; desalting; antibiotics; biomolecules. Broad application base.	100g 500g 1000g	13605 13606 13607	
HP20SS Polyaromatic (small particle version of HP20) Particle Size: 75-150µm Applications: Hydrophobic compounds; biomolecules from fermentation broths; rapid kinetics for large molecules; nonaqueous applications; industrial fractionation of small biomolecules.	100g 1000g	13613-U 13615-U	
SP20SS Polyaromatic. Particle Size: 50-100µm (fines removed) Applications : Small and medium proteins; hydrophobic compounds; chromatographic separations of peptides, amino acids; reversed phase	100g 500g 1000g	13617-U 13618-U 13619-U	
SP70 Polyaromatic Particle Size: 250-850µm. Applications: debittering juices and related food products; high capacity for naringen; precleaned. Meets requirements of FDA Food Additive Regulation 21 CFR 173.25.	1000g	13962-U	
SP825L Polyaromatic Particle Size: 250-600µm (fines removed) Applications: Antibiotics; organics; decolorization. High capacity for small molecules.	1000g	13883	
SP850 Polyaromatic Particle Size: 250-850µm Applications: Antibiotics; organics; hydrophobic compounds; adsorbing large quantities of small molecules.	100g 1000g	13597-U 13599	
HP2MG Polymethacrylic (intermediate polarity) Particle Size: 300-700µm. Applications: Hydrophobic compounds; antibiotics; aliphatics; color bodies; broad spectrum adsorption of small and large molecules.	100g 1000g	13601 13603	
SP207 Brominated polyaromatic Particle size: 250-800µm Applications: Upflow fluidized bed applications; strongly hydrophobic, high density, large capacity; more hydrophobic than styrene/DVB polymers.	1000g	13623-U	
MCI GEL CHP20P Polyaromatic Particle Size: 75-150µm Applications: Biopharmaceuticals; aromatic compounds; peptides; steroids; desalting; reversed phase applications. Good for nonaqueous use.	100g 500g	13629-U 13630-U	

Resins
Adsorption Media

DESCRIPTION	QTY.	CAT. NO.	PRICE
DOWEX RESINS			
Styrene-DVB Polyaromatic Applications: hydrophobic compounds; filtering aids; drilling muds; synthetic starting material. Mesh Size: 18-100	1000g	13390	
Optipore L-285 (formerly XUS-40285) Hydrophilic functionalized polyaromatic Applications: Surfactants; hydrophobic compounds; good for very hydrophobic proteins; decolorization.	1000g	13479-U	
Optipore L-323 (formerly XUS-40323) Polyaromatic (macroporous) Applications: Adsorption of soluble organics from polar solvents; aliphatic alcohols, glycols, glycerine from hydroxylic solvents; steroids; emulsifiers; surfactants; color compounds.	1000g	13475-U	
Optipore L-493 (formerly XUS-43493.00) Polyaromatic (more hydrophobic than activated carbon) Applications: Hydrophobic compounds; non-catalytic activity; liquid applications; phenol. Very high capacity for organics.	100g 500g 5kg 1 cubic foot	573698-100G 573698-500G 573698-5KG 573698-1FT3	
Optipore V-493 (dry) (formerly XUS-43493.01) Polyaromatic (more hydrophobic than activated carbon) Applications: Vapor applications; volatile organics and hazardous air pollutants; non-catalytic activity.	100g 500g 1000g	13485-U 13486 13487	
Optipore V-502 (dry) (formerly XU-43502.01) Polyaromatic Applications: Vapor applications; volatile organics and hazardous air pollutants. Low pressure drop. Large particle size version of Optipore V-493.	1000g	13678	
SD-2 Macroporous styrene divinylbenzene copolymer. Adsorbent. Ionic Form: free base. Applications: Decolorization, taste and odor removal in sweetener applications. Meets requirements of FDA Food Additive Regulation 21 CFR 173.25	100g 1000g	14043-U 14045-U	

DESCRIPTION	QTY.	CAT. NO.	PRICE
DUOLITE RESINS			
XAD-761 (previously known as S-761) Phenol-formaldehyde with methylol functionality (hydrophilic, highly porous) Mesh Size: 16-50 Applications: Removal of proteins; removal of high MW colorants; organic impurities; pharmaceuticals.	500g	10356	
SUPELITE AND SUPELPAK RESINS			
Supelite DAX-8 Acrylic ester (moderate polarity) Applications: compounds up to 150,000 MW; treatment of paper pulp mill wastes; alcohols; surfactants; decolorization, fulvic and humic compounds; organic removal.	100g	20278	
Supelpak-2 (a purified form of Amberlite XAD-2) Polyaromatic Applications: Air sampling. Meets US EPA-recommended criteria for purity, as outlined in Level I Environmental Assessment Procedures Manual.	100g 1000g	20279 21130-U	
Supelpak-2B (a purified form of Amberlite XAD-2) Polyaromatic Applications: PCBs from water. Specially cleaned to meet EPA requirements for determining PCBs in water according to the Great Lakes National Program Office (GLNPO).	100g	13670	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Amersham Pharmacia Biotech HiTrap Cartridges

- Affinity
- Gel Filtration
- HIC
- Ion Exchange

HiTrap Affinity Cartridges

HiTrap adapters and instruction manual included.

AFFINITY	QTY.	CAT. NO.	PRICE
NHS-activated, 1mL	5	54830	
NHS-activated, 5mL	1	54831	
Blue, 1mL	5	54832	
Blue, 5mL	1	54833	
Chelating, 1mL	5	54834	
Chelating, 5mL	1	54835	
Heparin, 1mL	5	54836	
Heparin, 5mL	1	54837	
Protein A, 1mL	5	54838	
Protein A, 5mL	1	54839	
Protein G, 1mL	5	54840-U	
Protein G, 5mL	1	54841	
MAbTrap G II Kit[1]		54842	

[1] For fast, effective purification of monoclonal and polyclonal IgG from ascites fluid, serum, or cell culture media, via syringe or pump. Sufficient materials for 20 purifications. Contents: 1mL HiTrap protein G column, 50mL 10X binding buffer concentrate (0.05% sodium azide preservative), 15mL 10X elution buffer concentrate (0.05% sodium azide), 25mL neutralizing buffer (0.05% sodium azide), luer adapter, domed nut, syringe, instructions.

HiTrap Gel Filtration (Sephadex G-25) Cartidges

HiTrap adapters and instruction manual included.

DESCRIPTION	QTY.	CAT. NO.	PRICE
HiTrap Desalting Column	5	54822	

HiTrap HIC Cartridges

Includes 1 each of five 1mL cartridges: Phenyl Sepharose High Performance, Phenyl Sepharose 6 Fast Flow (low salt), Phenyl Sepharose 6 Fast Flow (high salt), Butyl Sepharose 4 Fast Flow, Octyl Sepharose 4 Fast Flow, plus luer adapters, tubing connectors, domed nuts, and instructions.

DESCRIPTION	CAT. NO.	PRICE
HiTrap HIC Test Kit	54814	

HiTrap Ion Exchange Cartridges

Domed nuts, adapters, and instructions included.

DESCRIPTION	QTY.	CAT. NO.	PRICE
HiTrap Q, 1mL	5	54815	
HiTrap Q, 5mL	5	54816	
HiTrap SP, 1mL	5	54817	
HiTrap SP, 5mL	5	54818	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

RELATED INFORMATION

For additional information, request the following free literature by phone or fax, or see our website.

No.	Subject
T497080	HiTrap cartridges
T496127	HiTrap desalting columns

Resins
Affinity Media

Toyopearl Affinity Resins

These materials, consisting of 40-90µm hydrophilic polymer particles with 1000Å pores, can be used to rapidly separate and purify a wide variety of large biomolecules, such as enzymes and other proteins. Toyopearl resins feature:

- High resolving ability
- Chemical resistance (0.5M NaOH or 0.5M HCl)
- Wide pH range: 2-12
- Mechanical stability to 7kg/cm^2 (7bar/100psi)

CHARACTERISTICS OF TOYOPEARL AFFINITY RESINS			
Resin	Coupling Group	Density (µmol/mL)	Applications/Coupling Chemistries
REACTIVE RESINS			
Formyl-650M	aldehyde	60	couple to enzymes via primary amines; coupling agent: $NaCNBH_4$; optimal binding pH: 6.9-9.0
Amino-650M	amine	90	couple ligands via carboxylate or aldehyde groups; coupling agent: carbodiimide or $NaCNBH_4$; optimal binding pH: 4.5-6.0
ACTIVATED RESINS			
Tresyl-650M	tresyl	20	highly reactive to amine/thiol groups; no coupling agent required; optimal binding pH: 7-9
Epoxy-650M	epoxide	800	immobilization of protein or low MW ligands (e.g., glutathione, glycine)
GROUP SPECIFIC RESINS			
Chelate-650M	iminodiacetic	35	for creating a metal bearing resin or IMAC (Ca^{+2}, Ni^{+2}, Zn^{+2}, Co^{+2}) to bind to histidine acid, free cysteines of peptides or proteins, growth factors, tissue plasminogen activator, etc.
Heparin-650M	heparin	—	purification of coagulation factors, lipoproteins, growth factors, enzymes active in nucleic acid metabolism

Toyopearl Packings for Affinity Chromatography

TOYOPEARL PACKING	QUANTITY	CAT. NO.	PRICE
Toyopearl AF-Chelate-650M	25mL	814475	
Toyopearl AF-Heparin-650M	10mL	814473	
Toyopearl AF-Tresyl-650M	5g	814471	
Toyopearl AF-Amino-650M	25mL	808002	
Toyopearl AF-Epoxy-650M	10g	808000	
Toyopearl AF-Formyl-650M	25mL	808004	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Sephacryl

Crosslinked allyl dextran N,N' -methylenebisacrylamide copolymer for gel filtration. HR grades are smaller particles with narrower size distributions, for more efficient separations and faster flow. Supplied swollen, suspended in 20% aqueous ethanol.

Autoclavable, stable to 0.2M NaOH. Store at 0-5°C.

QUANTITY	CAT. NO.	PRICE
S-100 HR, 1K-100K (PROTEINS)[1]		
100mL	S100HR-100ML	
250mL	S100HR-250ML	
750mL	S100HR-750ML	
S-200 HR, 5K-250K (PROTEINS)[1]		
100mL	S200HR-100ML	
250mL	S200HR-250ML	
750mL	S200HR-750ML	
S-300 HR, 10K-1500K (PROTEINS)[1]		
100mL	S300HR-100ML	
250mL	S300HR-250ML	
750mL	S300HR-750ML	
S-400 HR, 20K-8000K (PROTEINS)[1]		
100mL	S400HR-100ML	
250mL	S400HR-250ML	
750mL	S400HR-750ML	
S-500 HR, 40K-20,000K (DEXTRANS)[1]		
100mL	S500HR-100ML	
250mL	S500HR-250ML	
750mL	S500HR-750ML	

Sephadex

For purifying proteins and peptides by GFC with aqueous solvents. Dextran media with low exclusion limits are commonly used in rapid desalting procedures and in concentrating solutions of macromolecules.

Autoclavable, stable to 0.2M NaOH.

QUANTITY	CAT. NO.	PRICE
G-10, <700[1]		
10g	G10120-10G	
50g	G10120-50G	
100g	G10120-100G	
500g	G10120-500G	
G-15, <1500[1]		
10g	G15120-10G	
50g	G15120-50G	
100g	G15120-100G	
G-25, 1K-5K (PROTEINS)[1]		
Coarse		
10g	G25300-10G	
50g	G25300-50G	
100g	G25300-100G	
500g	G25300-500G	
Medium		
10g	G25150-10G	
50g	G25150-50G	
100g	G25150-100G	
500g	G25150-500G	

[1] Fractionation Range.

Sephadex (cont'd)

QUANTITY	CAT. NO.	PRICE
G-25, 1K-5K (PROTEINS)[1]		
Fine		
10g	G2580-10G	
50g	G2580-50G	
100g	G2580-100G	
500g	G2580-500G	
Superfine		
10g	G2550-10G	
50g	G2550-50G	
100g	G2550-100G	
G-50, 1.5K-30K (PROTEINS)[1]		
Coarse		
10g	G50300-10G	
50g	G50300-50G	
100g	G50300-100G	
Medium		
10g	G50150-10G	
50g	G50150-50G	
100g	G50150-100G	
500g	G50150-500G	
Fine		
10g	G5080-10G	
50g	G5080-50G	
100g	G5080-100G	
500g	G5080-500G	
Superfine		
10g	G5050-10G	
50g	G5050-50G	
100g	G5050-100G	
G-75, 3K-80K (PROTEINS)[1]		
10g	G75120-10G	
50g	G75120-50G	
100g	G75120-100G	
500g	G75120-500G	
Superfine		
10g	G7550-10G	
50g	G7550-50G	
100g	G7550-100G	
G-100, 4K-150K (PROTEINS)[1]		
10g	G100120-10G	
50g	G100120-50G	
100g	G100120-100G	
500g	G100120-500G	
Superfine		
10g	G10050-10G	
50g	G10050-50G	
100g	G10050-100G	

Books on Gel Filtration

DESCRIPTION	CAT. NO.	PRICE
Gel Filtration Chromatography	23578	

RELATED INFORMATION

For a more complete discussion of our GFC media, request a copy of Bulletin T194881.

Resins
Gel Filtration Media

Sepharose

Beaded agarose for fractionating molecules of high molecular weight. Crosslinked (CL) beaded agarose is more resistant to denaturing conditions and thus offers more versatility in the choice of sample buffer and eluent. Supplied swollen.

The approximate % agarose concentration is indicated by the first digit of the catalog number, e.g.: “6” in 6B-100.

Sepharose media should not be exposed to temperatures above 40°C.

Stable to 0.5M NaOH. Store at 0-5°C.

QUANTITY	CAT. NO.	PRICE
6B, 10K-4000K (PROTEINS)[1]		
100mL	6B100-100ML	
500mL	6B100-500ML	
1liter	6B100-1L	
CL-6B, 10K-4000K (PROTEINS)[1]		
100mL	CL6B200-100ML	
500mL	CL6B200-500ML	
1liter	CL6B200-1L	
4B, 60K-20,000K (PROTEINS)[1]		
100mL	4B200-100ML	
500mL	4B200-500ML	
1liter	4B200-1L	
CL-4B, 60K-20,000K (PROTEINS)[1]		
100mL	CL4B200-100ML	
500mL	CL4B200-500ML	
1liter	CL4B200-1L	
2B, 70K-40,000K (PROTEINS)[1]		
100mL	2B300-100ML	
500mL	2B300-500ML	
1liter	2B300-1L	
CL-2B70K-40,000K (PROTEINS)[1]		
100mL	CL2B300-100ML	
500mL	CL2B300-500ML	
1liter	CL2B300-1L	

Superdex

A composite matrix of dextran and highly crosslinked porous agarose, Superdex media combine the high selectivity of a Sephadex matrix with the chemical and physical stability of crosslinked agarose. Optimized for high resolution preparative separations. Supplied in 20% ethanol. Also available as a 13µm bead, packed in FPLC columns (see the Biopolymer Columns section).

Store at 0-5°C.

QUANTITY	CAT. NO.	PRICE
SUPERDEX 30 PREP GRADE, <10K (PROTEINS)		
25mL	S2792-25ML	
100mL	S2792-100ML	
SUPERDEX 75 PREP GRADE, 3K-70K (PROTEINS)		
25mL	S6657-25ML	
100mL	S6657-100ML	
SUPERDEX 200 PREP GRADE, 10K-600K (PROTEINS)		
100mL	S6782-100ML	

Toyopearl Size Exclusion Packings [2]

Toyopearl packings for size exclusion/gel filtration chromatography offer important features:

- High mechanical strength – use at high flow rates
- Stability in organic solvents
- Can be packed by hydrostatic pressure or pump (5-7 bar)
- pH range 2-12
- Can be autoclaved

Toyopearl media fractionate mixtures of proteins and other large molecular weight compounds over a wide size range. You can use these packings for such diverse analyses as separating RNA from protein, resolving oligosaccharides by degree of polymerization, and isolating agglutinin while maintaining a high hemagglutination titer. Toyopearl HW-40 gel, in particular, can be used very effectively with organic solvents.

TOYOPEARL PACKING	PARTICLE SIZE (µm)	QUANTITY (mL)	CAT. NO.	PRICE
HW-40C	50-100	500	807449	
HW-40F	30-60	500	807448	
HW-40S	20-40	250	807451	
HW-50F	30-60	500	807453	
HW-50S	20-40	250	807455	
HW-55F	30-60	500	807457	
HW-55S	20-40	250	807459	
HW-65F	30-60	500	807465	
HW-65S	20-40	250	807467	
HW-75F	30-60	500	807469	

Toyopearl Size Exclusion LABPAK Sample Kits

LABPAK samplers enable you to try several Toyopearl resins to determine which works best for your particular application.

RESIN	PARTICLE SIZE (µm)	MW RANGE (GLOBULAR PROTEINS)[2]	CAT. NO.	PRICE
SECPAK LMW Sampler (150mL each resin)			843300	
HW-40F	30-60	100-10,000		
HW-50F	30-60	500-80,000		
HW-55F	30-60	1-700 x 10^3		
SECPAK HMW Sampler (150mL each resin)			843310	
HW-55F	30-60	1-700 x 10^3		
HW-65F	30-60	40-5000 x 10^3		
HW-75F	30-60	500-50,000 x 10^3		
SECPAK HP Sampler (120mL each resin)			843350	
HW-40S	20-40	100-10,000		
HW-50S	20-40	500-80,000		
HW-55S	20-40	1-700 x 10^3		
HW-65S	20-40	40-5000 x 10^3		

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

[1] Fractionation Range.

[2] Ranges for dextrans: HW-40: 100-7000; HW-50: 500-20,000; HW-55: 1000-200,000; HW-65: 10,000-1,000,000; HW-75: 100,000-10,000,00 0.

Sepharose Hydrophobic Interaction Media

Long-term pH stability: 3-13 (3-12 for Octyl Sepharose CL-4B and Phenyl Sepharose CL-4B).

MEAN PARTICLE SIZE (µm)	LIGAND DENSITY (µmol/mL DRY GEL)	QTY.	CAT. NO.	PRICE
Phenyl Sepharose High Performance (6% crosslinked agarose)				
34	25	10mL	P2209-10ML	
		50mL	P2209-50ML	
Phenyl Sepharose 6 Fast Flow, low sub (6% crosslinked agarose)				
45-165	20	50mL	P2334-50ML	
		200mL	P2334-200ML	
Phenyl Sepharose 6 Fast Flow, high sub (6% crosslinked agarose)				
45-165	40	50mL	P2459-50ML	
		200mL	P2459-200ML	
Butyl Sepharose 4 Fast Flow (4% crosslinked agarose)				
		10mL	B9041-10ML	
45-165	50	50mL	B9041-50ML	
Octyl Sepharose 4 Fast Flow (4% crosslinked agarose)				
		10mL	O0511-10ML	
45-165	5	200mL	O0511-200ML	
Octyl Sepharose CL-4B (4% crosslinked agarose)				
45-165	40	50mL	O6001-50ML	
		200mL	O6001-200ML	
Phenyl Sepharose CL-4B (4% crosslinked agarose)				
		10mL	P7892-10ML	
45-165	40	50mL	P7892-50ML	
		200mL	P7892-200ML	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Toyopearl Hydrophobic Interaction Media

Toyopearl HIC media offer these advantages:

- Strong affinity for water-soluble proteins
- High recovery of mass and activity
- High sample capacity – up to 2-4 times that of conventional gels
- Fluctuating salt concentrations will not change bed volume
- Mechanical stability to 7kg/cm^2 (7bar/100psi)
- pH range 2-12
- Clean in place with 0.5M NaOH
- Autoclavable

Toyopearl media offer high yield recovery of proteins, using various aqueous eluants. The resins have an exclusion limit of 5 x 10^6 Dalton. The large pore size, 1000Å, enables these packings to separate very large proteins by a hydrophobic interaction mechanism, without size exclusion effects.

100mL bottle

TOYOPEARL MEDIUM	PARTICLE SIZE (µm)	CAT. NO.	PRICE
Butyl-650C	60-150	807478	
Butyl-650M	40-90	807477	
Butyl-650S	20-50	807476	
Phenyl-650M	40-90	814478	
Phenyl-650S	20-50	814477	
Ether-650M	40-90	816173	

Toyopearl Hydrophobic Interaction LABPAK Sampler Kits

LABPAK kits enable you to try several Toyopearl resins to determine which works best for your particular application.

KIT	PARTICLE SIZE (µm)	HYDROPHOBICITY	CAT. NO.	PRICE
HICPAK SAMPLER				
50mL each resin			843100	
Ether-650M	40-90	weak		
Phenyl-650M	40-90	medium		
Butyl-650M	40-90	strong		
HICPAK HP SAMPLER				
25mL each resin			843150	
Ether-650S	20-50	weak		
Phenyl-650S	20-50	medium		
Butyl-650S	20-50	strong		

Resins
Anion Exchange Media

Strong Anion Exchangers on Polystyrene (Type I and Type II)

EXCHANGER	CROSS LINK (%)	MATRIX[1]	MESH	IONIC FORM	MOISTURE (Approx. %)	MAX. OP. TEMP. (°C) [2]	TOTAL EXCHANGE CAPACITY meq/mL	TOTAL EXCHANGE CAPACITY meq/g	pH RANGE
AMBERLITE STRONG ANION EXCHANGERS, TYPE I (QUATERNARY AMMONIUM)									
IRA-900 Cl	—	Mr	16-50	Cl	60	60/77	1.0	4.2	0-14
IRA-958 Cl	—	Mr	16-50	Cl	69	38/77	0.80	4.1	0-14
IRA-400 Cl	8	G	16-50	Cl	45	60/77	1.4	3.8	0-14
IRA-400 OH	8	G	16-50	OH	45	60/77	1.2	4.0	0-14
IRA-402 Cl	6	G	16-50	Cl	53	60/77	1.2	4.1	0-14
IRA-458 Cl	—	G	16-50	Cl	58	38/60	1.2	4.4	0-14
4200 (Cl)[3]	—	G	625µm	Cl	53	50	1.2	3.7	0-14
IRN78	8	G	16-50	OH	≤60	60	1.1	4.0	0-14
A26	—	MR	16-45	OH	69	60/90	0.95	4.2	0-14
DIAION STRONG ANION EXCHANGERS, TYPE I (QUATERNARY ALKYLAMINE)									
HPA25	—	HP	30-70	Cl	63	70/90	0.6	2.4	0-14
NSA100	—	G	16-50	Cl	41	60/80	1.3	3.4	0-14
PA306S	3	P	40-100	Cl	71	60/80	0.8	4.2	0-14
PA308	4	P	16-50	Cl	62	60/77	1.0	4.0	0-14
PA312	6	P	16-50	Cl	52	60/77	1.2	3.7	0-14
PA316	8	P	16-50	Cl	47	60/80	1.3	—	0-14
SA10A	—	G	16-50	Cl	45	60/77	1.3	3.4	0-14
SA11A	—	G	16-50	Cl	50	60/77	0.8	2.6	0-14
SA12A	—	G	16-50	Cl	52	60/80	1.3	—	0-14
DOWEX STRONG ANION EXCHANGERS, TYPE I (TRIMETHYLBENZYL AMMONIUM)									
1x2	2	G	16-100	Cl	75	66/99	0.7	4.2	0-14
1x2	2	G	50-100	Cl	70	66/99	0.7	3.5	0-14
1x2	2	G	100-200	Cl	75	66/99	0.6	3.5	0-14
1x2	2	G	200-400	Cl	75	66/99	0.6	3.5	0-14
1x4	4	G	20-50	Cl	≥50	66/99	1.0	3.5	0-14
1x4	4	G	50-100	Cl	≥50	66/99	1.0	3.5	0-14
1x4	4	G	100-200	Cl	59	66/99	1.0	3.5	0-14
1x4	4	G	200-400	Cl	59	66/99	1.0	3.5	0-14
1x8	8	G	50-100	Cl	46	66/99	1.2	3.5	0-14
1x8	8	G	100-200	Cl	42	66/99	1.2	3.5	0-14
1x8	8	G	200-400	Cl	42	66/99	1.2	3.5	0-14
11[4]	—	G	640µm	Cl	52	60	1.2	3.6	0-14
550A[5]	—	G	550µm	OH	47(Cl)	60	1.2	3.4	0-14
550A UPW[5]	—	G	550µm	OH	47(Cl)	60	1.2	3.4	0-14
MSA[4]	—	Mp	640µm	Cl	60	60/99	1.0	4.0	0-14
SBR-C	8	G	16-45	Cl	46	66/99	1.4	3.7	0-14
SBR LC NG	8	G	16-50	OH	≤60	60	1.1	–	0-14
SBR-P-C	8	G	16-45	OH	54	66/99	1.2	4.0	0-14
21K	—	G	16-30	Cl	54	60/100	1.2	3.8	0-14
A[4]	—	G	610µm	OH	66	60/100	1.0	—	0-14
A[4]	—	G	575µm	Cl	57	60	1.2	4.0	0-14
21K XLT	—	G	16-20	Cl	55	60/100	1.2	3.8	0-14
AMBERLITE STRONG ANION EXCHANGERS, TYPE II (DIMETHYLETHANOLAMINE)									
IRA-910 Cl	—	Mr	16-50	Cl	52	40/77	1.0	3.8	0-14
IRA-410 Cl	—	G	20-50	Cl	42	40/77	1.4	3.4	0-14
DIAION STRONG ANION EXCHANGERS,TYPE II (QUATERNARY ALKYLALKANOLAMINE)									
PA408	4	P	16-50	Cl	59	40/60	0.9	3.3	0-14
PA412	6	P	16-50	Cl	49	40/60	1.1	—	0-14
PA418	9	P	16-50	Cl	41	40/60	1.3	3.3	0-14
SA20A	—	G	16-50	Cl	42	40/60	1.3	3.2	0-14
SA21A	low	G	16-50	Cl	60	40/60	0.8	3.1	0-14
DOWEX STRONG ANION EXCHANGERS, TYPE II (DIMETHYLETHANOLBENZYL AMMONIUM)									
2x8	8	G	50-100	Cl	<38	66/99	1.2	—	0-14
2x8	8	G	100-200	Cl	37	66/99	1.2	—	0-14
2x8	8	G	200-400	Cl	37	66/99	1.2	—	0-14
22	—	Mp	16-50	Cl	52	46	1.2	—	0-14
A2[4]	—	G	550µm	Cl	42	35/79	1.3	3.2	0-14

[1] G = gel; Mr = macroreticular; Mp = macroporous; HP = highly porous; P = porous

[2] OH/Cl form

[3] Amberjet exchanger

[4] Marathon exchanger

[5] Monosphere exchanger

Weak Anion Exchangers on Polystyrene

EXCHANGER	CROSS LINK (%)	MATRIX[1]	MESH	IONIC FORM	MOISTURE (Approx. %)	MAX. OP. TEMP. (°C) [2]	TOTAL EXCHANGE CAPACITY meq/mL	TOTAL EXCHANGE CAPACITY meq/g	pH RANGE
AMBERLITE WEAK ANION EXCHANGERS (POLYAMINE)									
IRA-67	—	G	16-50	FB[3]	60	60	1.6	5.6	0-7
IRA-95	—	Mr	16-50	FB58	100	1.3	4.7	0-7	
IRA-96	—	Mr	16-50	FB60	100	1.6	5.6	0-7	
IRA-743	—	—	16-50	FB58	100	0.6	—	0-10	
DIAION WEAK ANION EXCHANGERS (ALKYLAMINE)									
WA10	—	G	16-50	FB66	60	1.2	—	0-9	
WA21J	—	HP	16-50	FB46	100	2.0	5.8	0-9	
WA30	—	HP	16-50	FB49	100	1.5	3.0	0-9	
CRB02	—	HP	16-50	FB55	60/79	0.8	2.7	0-14	
DOWEX WEAK ANION EXCHANGERS (POLYAMINE)									
66	—	Mp	16-50	FB45	60	1.4	4.0	0-7	
66	—	Mp	550µm	FB45	60	1.4	4.0	0-7	
77	—	Mp	550µm	FB45	60	1.7	4.8	0-7	
WBA[4]	—	Mp	400µm	FB54	60/93 [5]	1.25	4.2	0-7	
WBA-2[4]	—	Mp	550µm	FB45	60	1.7	4.8	0-7	
M-43	—	Mp	16-50	FB≤45	60	1.55	—	0-14	
DUOLITE WEAK ANION EXCHANGERS (POLYAMINE)									
A-7	—	Mr	16-50	FB56	40	2.2	13.9	0-6	

[1] G = gel; Mr = macroreticular; Mp = macroporous; HP = highly porous; P = porous
[2] OH/Cl form
[3] free base
[4] Marathon exchanger
[5] FB/HCl

Comparable Anion Exchangers on Polystyrene

AMBERLITE	DIAION	DOWEX
STRONG TYPE I		
IRA-900	PA308/PA312	11/MSA
IRA-904[6]	PA308	11/MSA
IRA-938[6]		
IRA-958		
IRA-400	SA10A	SBR
IRA-400(OH)	SA10A	SBR
IRA-401S[3]	SA11A	1x4
IRA-402, IRA-404[4]	SA12A	11/SBR-P
IRA-420C[6]	SA10A	11/21K/SBR/SBR-P
IRA-458		
IRA-420C[6]	SA10AS[3]	
Amberjet 4200		550A, G-55[6], N-196[6]
STRONG TYPE II		
IRA-910	PA418	MSA-2, 22
IRA-410/416[6]	SA20A[6]	SAR, A2
WEAK		
IRA-67[7]	WA103[6]	
IRA-93, IRA-95	WA30	66/MWA-1
IRA-94[6], IRA-96	WA30	N-283[6]

[6] Not available. Substitute WA10.
[7] Formerly IRA-68.

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Resins
Anion Exchange Media

Amberlite Strong Anion Exchangers, Type I

Functional Group: quaternary ammonium
Effective pH Range:0-14.
Meet requirements of FDA Food Additive Regulation 21 CFR 173.25.

QTY.	CAT. NO.	PRICE
IRA900 Polystyrene, macroreticular Form: chloride Applications: decolorizing intermediate to light solutions; heparin at neutral pH; metal ions; hydrogen peroxide		
500g	10381-U	
IRA958 Polystyrene, macroreticular Form: chloride Applications: removal of color and organics; cane sugar treatment; metal complexes; citric acid (resistant to organic fouling)		
500g	10337	
IRA400 Polystyrene, gel Crosslinkage: 8% Form: chloride Applications: usually used for treatment of waters that are essentially free of organic material; deionization including silica reduction; deoxygenating; removal of amino acids at high pH; separation of kanamycin A&B		
500g	10326	
IRA400 Polystyrene, gel Crosslinkage: 8% Form: hydroxide Applications: same as for IRA400Cl		
500g	501980	
IRA402 Polystyrene, gel Crosslinkage: 6% Form: chloride Applications: water conditioning; removal of weakly acidic contaminants (chemically the same as IRA-400, but with lower crosslinkage to give better diffusion rates with large organics)		
500g	10328	
IRA458 Polystyrene, gel Form: chloride Applications: treatment of water which produces severe fouling with other resins; metals and metal salts/ complexes; biuret; (hydrophilic structure is more resistant to organic fouling)		
500g	10330	
IRN78 Polystyrene, gel, Nuclear Grade Form: hydroxide, minimum of 95% exchange sites Applications: Water treatment, RAD waste, decontamination, useful for boron thermal regeneration.		
500g	10343	

Amberlite Strong Anion Exchangers, Type II

Functional Group: dimethylethanolamine
Effective pH Range:0-14.
Meet requirements of FDA Food Additive Regulation 21 CFR 173.25.

QTY.	CAT. NO.	PRICE
IRA410 Polystyrene, gel Form: chloride Applications: higher regeneration efficiency; water conditioning; iodine ions; neutralization of solutions; xanthan and xanthene dyes		
500g	10329	
IRA910 Polystyrene, macroreticular Form: chloride Applications: improved regeneration efficiency; water conditioning and deionization; removal of sulfuric acid and color		
500g	10334-U	

HELPFUL HINTS

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Diaion Strong Anion Exchangers, Type I

Functional Group: quaternary alkylamine
Effective pH Range:0-14.
Meet requirements of FDA Food Additive Regulation 21 CFR 173.25.

QTY.	CAT. NO.	PRICE
HPA25 Polystyrene, highly porous Form: chloride Applications: large organics; enzyme immobilization; demineralization; deashing (highest porosity Type I strong anion exchanger available)		
1000g	13491-U	
PA308 Polystyrene, porous Crosslinkage: 4% Form: chloride Applications: deionization of water; catalyst; separation of amino acids; recovery of metals; sugar refining; decolorization; formalin refining		
1000g	13495	
PA312 Polystyrene, porous Crosslinkage: 6% Form: chloride Applications: deioniz-ation of water; catalyst; separation of amino acids; recovery of metals; sugar refining; decolorization; formalin refining		
1000g	13499	

Dowex Strong Anion Exchangers, Type I

Functional Group: trimethylbenzyl ammonium
Effective pH Range:0-14
Meet requirements of FDA Food Additive Regulation 21 CFR 173.25 (unless otherwise noted).

QTY.	CAT. NO.	PRICE
1X2		
Polystyrene, gel Crosslinkage: 2% Form: chloride Applications: food & drug processing Manufactured under cGMP		
Mesh Size: 16-100		
1000g	13367	
Mesh Size: 50-100		
100g	44290-100G	
500g	44290-500G	
2500g	44290-2.5KG	
1 cubic foot	44290-1FT3	
Mesh Size: 100-200		
100g	217387-100G	
500g	217387-500G	
2500g	217387-2.5KG	
1 cubic foot	217387-1FT3	
Mesh Size: 200-400		
100g	217395-100G	
500g	217395-500G	
2500g	217395-2.5KG	
1 cubic foot	217395-1FT3	
1X4		
Polystyrene, gel Crosslinkage: 4% Form: chloride		
Mesh Size: 20-50		
100g	428612-100G	
500g	428612-500G	
1 cubic foot	428612-1FT3	
Mesh Size: 50-100		
100g	44310-100G	
500g	44310-500G	
1 cubic foot	44310-1FT3	
Mesh Size: 100-200		
100g	428590-100G	
500g	428590-500G	
1 cubic foot	428590-1FT3	
Mesh Size: 200-400		
100g	428604-100G	
500g	428604-500G	
1 cubic foot	428604-1FT3	

Dowex Strong Anion Exchangers, Type I (cont'd)

QTY.	CAT. NO.	PRICE
1X8		
Polystyrene, gel Crosslinkage: 8% Form: chloride		
Mesh Size: 50-100		
100g	217417-100G	
500g	217417-500G	
2500g	217417-2.5KG	
1 cubic foot	217417-1FT3	
Mesh Size: 100-200		
100g	217425-100G	
500g	217425-500G	
2500g	217425-2.5KG	
1 cubic foot	217425-1FT3	
Mesh Size: 200-400		
100g	44340-100G	
500g	44340-500G	
2500g	44340-2.5KG	
1 cubic foot	44340-1FT3	
Marathon 11 (previously known as Dowex 11) Polystyrene, gel Form: chloride Applications: specifically suited for demineralization of high organic waters; removal of organic material and color bodies; low silica leakage		
1000g	13435	
Monosphere 550A Polystyrene, gel, Monodispersed Form: hydroxide Particle Size: 550µm Applications: high efficiency and capacity for mixed-bed applications; condensate polishing		
250g	436607-250G	
1000g	436607-1KG	
1 cubic foot	436607-1FT3	
Marathon MSA (previously known as MSA-1) Polystyrene, macroporous Form: chloride Applications: removal of organic impurities with minimum organic fouling; deionization; silica removal; condensate polishing		
500g	MSA1-500G	
SBR-C Polystyrene, gel Form: chloride Applications: narrower particle size distribution suited to deep-bed condensate polishing; good for mixed-bed applications; demineralization		
100g	573701-100G	
500g	573701-500G	
5000g	573701-5KG	[^573701-5KG]
1 cubic foot	573701-1FT3	
SBR LC NG Polystyrene, gel, Nuclear Grade Form: hydroxide, minimum of 95% exchange sites Applications: Water treatment, CVCS and radwaste demineralizers, reactor coolant treatment; useful for boric acid recovery		
100g	14035-U	
1000g	14036-U	
2500g	14037-U	
5000g	14038-U	
Dowex 21K Polystyrene, gel Form: chloride Applications: mining grade material Does not meet FDA 21 CFR 173.25		
250g	436658-250G	
Marathon A Polystyrene, macroporous, monodispersed Form: chloride Particle Size: 575µm Applications: demineralization; water with high concentration of weak ions (silica, CO_2); organics-laden feed waters		
250g	433942-250G	
1000g	433942-1KG	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Dowex Strong Anion Exchangers, Type II

Functional Group: dimethylethanolbenzyl ammonium
Effective pH Range:0-14
Meet requirements of FDA Food Additive Regulation 21 CFR 173.25

QTY.	CAT. NO.	PRICE
2X8		
Styrene-divinylbenzene, gel Crosslinkage: 8% Form: chloride		
Mesh Size: 50-100		
100g	428620-100G	
500g	428620-500G	
1 cubic foot	428620-1FT3	
Mesh Size: 100-200		
100g	428639-100G	
500g	428639-500G	
2500g	428639-2.5KG	
1 cubic foot	428639-1FT3	
Mesh Size: 200-400		
100g	428647-100G	
500g	428647-500G	
5000g	428647-5KG	
1 cubic foot	428647-1FT3	
22 Styrene-divinylbenzene, macroporous Form: chloride Applications: deashing and mixed bed polishing of high fructose corn syrups		
250g	436623-250G	
1000g	436623-1KG	
Marathon A2 Styrene-divinylbenzene, gel, monodispersed Form: chloride Particle Size: 550µm Applications: demineralization; well suited for water with high concentration of mineral acids (chlorides, sulfates) and low concentration of silica and CO_2 (<25%)		
250g	433934-250G	
1000g	433934-1KG	

Amberlite Weak Anion Exchangers

Functional Group: polyamine
Meet requirements of FDA Food Additive Regulation 21 CFR 173.25 (unless otherwise noted).

QTY.	CAT. NO.	PRICE
IRA67 (also known as IRA-68) Acrylic, gel Form: free base Applications: unusually high capacity for large organics; deacidification, deionization of process liquors; isolation of acidic natural products; novabiacin and cephalosporins; separation of neutral and acidic amino acids below pH 10; removal of heparinic acid at low pH; citric acid; demineralization of cheese whey		
500g	10331	
IRA95 Styrenic, macroreticular Form: free base Applications: exceptional resistance to organic fouling; deacidification, deionization of water where removal of strong mineral and organic acids is desired; deionization of process liquors; removal of heparinic acid at low pH; heavy metals		
1000g	10425	
IRA96 Styrenic, macroreticular Form: free base Applications: deionization; chromate recovery; formaldehyde deacidification; ammonium nitrate removal and recovery Does not meet FDA Food Additive Regulation 21 CFR 173.25.		
100g	A8709-100G	
500g	A8709-500G	
1000g	A8709-1KG	
IRA743 Styrenic, macroreticular Form: free base Applications: borate-specific weak anion exchanger		
100g	IRA743-100G	
250g	216445-250G	
500g	IRA743-500G	
1000g	216445-1KG	

Resins
Anion Exchange Media

Diaion Weak Anion Echangers

QTY.	CAT. NO.	PRICE
WA10 Acrylic, gel Functional Group: tertiary amine Form: free base Applications: pretreatment of starch hydrolysates containing high levels of minerals; treatment of fluids containing troublesome foulants; purification of dextrose, beet sugar solutions, or formaldehyde		
1000g	13944-U	
WA21J Styrenic, highly porous Functional Group: Primary and Secondary Amine Form: free baseReverse Swelling: ($OH^- \rightarrow Cl^-$) 30% Applications: removal of strong mineral acids from water; treatment of organic solvents; rigorous industrial applications. Meets requirements of FDA Food Additive Regulation 21 CFR 173.25.		
1000g	13895	
WA30 Styrenic, highly porous Functional Group: alkylamine Form: free base Reverse Swelling: ($OH^- \rightarrow Cl^-$) 30% Applications: best in class for high MW organic acids; strong decolorization capability; water treatment; pretreatment of corn syrup, beet sugar and dextrose; refining of formalin, glycerine, and enzymes; catalyst Meets requirements of FDA Food Additive Regulation 21 CFR 173.25.		
100g	13541	
1000g	13543	
CRB02 Styrenic, highly porous Functional Group: glucamine Form: free base Applications: high selectivity for borate ion; useful for low levels at high flow rates		
1000g	13959-U	

Dowex Weak Anion Exchangers

Functional Group: polyamine

Meet requirements of FDA Food Additive Regulation 21 CFR 173.25.

QTY.	CAT. NO.	PRICE
66 Styrenic, macroporous Form: free base Applications: deashing and mixed bed polishing of high fructose corn syrups		
250g	436674-250G	
1000g	436674-1KG	
Monosphere 66 Styrenic, macroporous, monodispersed Form: free baseParticle Size: 550µm Applications: same as for Dowex 66.		
1000g	13705	
Monosphere 77 Styrenic, macroporous, monodispersed Form: free baseParticle Size: 550µm Applications: deashing and mixed bed polishing of high fructose corn syrups		
1000g	502529D	
Marathon WBA (Replacement for MWA1) Styrenic, macroporous, monodispersed Form: free baseParticle Size: 400µm Applications: demineralization; well suited for combined use with strong base anion resins for water with high concentration of mineral anions or high organic fouling potential		
250g	436666-250G	
1000g	436666-1KG	
Dowex M-43 Styrenic, macroporous Functional Group: dimethylamine Form: free base Applications: acts like an acid absorber, capable of removing both mineral and organic acids; nothing released back into solution that will make a sludge or change the process stream.		
100g	14031-U	
1000g	14032-U	
2500g	14033-U	
5000g	14034-U	

Duolite Weak Anion Exchanger

QTY.	CAT. NO.	PRICE
A-7 Phenol-formaldehyde, macroreticular Functional Group: polyamine Form: free baseReverse Swelling: ($OH^- \rightarrow Cl^-$) 23-28% Applications: sugar deionization; removal of high molecular weight colorants (e.g., wine processing); organic acids; lactose; metal ions (high porosity, hydrophilic)		
500g	10348	

HELPFUL HINTS

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Strong Cation Exchangers on Polystyrene

EXCHANGER	CROSS LINK (%)	MATRIX[1]	MESH	IONIC FORM	MOISTURE (Approx. %)	MAX. OP. TEMP. (°C) [2]	TOTAL EXCHANGE meq/mL	CAPACITY meq/g	pH RANGE
AMBERLITE STRONG CATION EXCHANGERS (SULFONIC ACID)									
200C	20	Mr	16-50	Na	48	150	1.7	4.2	0-14
IR120 H	8	G	16-50	H	45	121	1.9	4.4	0-14
IR122 Na	10	G	16-50	Na	40	121	2.1	4.4	0-14
15[2]	—	Mr	16-50	H	<1	120	1.8	4.7	0-14
1200 H[3]	—	G	650µm	H	52	120	1.8	4.7	0-14
IRN77	8	G	16-50	H	≤55	121	1.8	5.0	0-14
DIAION STRONG CATION EXCHANGERS (SULFONIC ACID)									
EXC04	—	HP	16-50	H	55	120	1.2	—	0-14
HPK25	—	HP	16-50	Na	42	125	1.8	3.9	0-14
PK208	4	P	16-50	Na	63	120	1.2	4.3	0-14
PK212	6	P	16-50	Na	55	120	1.5	—	0-14
PK216	8	P	16-50	Na	49	120	1.75	—	0-14
PK220L	10	P	16-40	Na	44	120	1.9	—	0-14
PK228L	14	P	16-50	Na	40	120	2.0	4.2	0-14
RCP160M	—	HP	25-60	H	50	120	1.5	4.5	0-14
SK1B	8	G	16-50	Na	46	120	1.9	3.6	0-14
SK1BS	8	G	150-350µm	Na	46	120	1.9	4.0	0-14
SK104	4	G	16-50	Na	62	120	1.2	4.0	0-14
SK110	10	G	16-50	Na	40	120	2.0	—	0-14
SK112	12	G	16-50	Na	37	120	2.1	3.9	0-14
SK116	16	G	16-50	Na	32	120	2.1	3.6	0-14
UBK510L	4	G	300-360µm	Na	40	120	1.9	—	0-14
UBK555	8	G	200-240µm	Ca	44	120	2.0	—	0-14
DOWEX STRONG CATION EXCHANGERS (SULFONIC ACID)									
50Wx2	2	G	50-100	H	78	150	0.6	4.8	0-14
50Wx2	2	G	100-200	H	78	150	0.6	4.8	0-14
50Wx2	2	G	200-400	H	78	150	0.6	4.8	0-14
50Wx4	4	G	50-100	H	68	150	1.1	4.8	0-14
50Wx4	4	G	100-200	H	68	150	1.1	4.8	0-14
50Wx4	4	G	200-400	H	68	150	1.1	4.8	0-14
50Wx8	8	G	50-100	H	53	150	1.7	4.8	0-14
50Wx8	8	G	100-200	H	54	150	1.7	4.8	0-14
50Wx8	8	G	200-400	H	54	150	1.7	4.8	0-14
DR-2030	—	Mp	30-60	H	3	150	1.7	4.7	0-14
HCR-W2	8	G	16-40	H	52	150	1.8	4.8	0-14
HCR-W2	8	G	16-40	Na	46	150	2.0	3.7	0-14
HGR-W2	10	G	16-40	H	40	150	2.2	4.2	0-14
MSC[4]	—	Mp	520µm	H	47	150	1.7	4.5	0-14
MSC[4]	—	Mp	550µm	Na	47	150	1.7	4.5	0-14
650C[5]	—	G	650µm	H	48	150	1.9	4.6	0-14
650C UPW[6]	—	G	650µm	H	48	150	1.9	4.6	0-14
G-26	—	G	650µm	H	48	150	1.9	4.6	0-14
88	—	Mp	16-40	Na	45	43	1.8	3.8	0-14
88[5]	—	Mp	550µm	Na	45	43	1.8	3.8	0-14
M-31	—	Mp	16-40	H	52	150	1.7	4.7	0-14
M-31[5]	—	Mp	475µm	H	52	150	1.7	4.7	0-14
99K/320[5]	—	G	320µm	K	59	150	1.5	4.5	0-14
99K/350[5]	—	G	350µm	K	59	150	1.5	4.5	0-14
99Ca/320[5]	6%	G	320µm	Ca	59	150	1.5	4.5	0-14
99Ca/350[5]	—	G	350µm	Ca	59	150	1.5	4.5	0-14
Marathon C[4]	8%	G	550µm	H	53	150	1.8	5.6	0-14
N-406	—	G	650µm	H	49	150	1.9	—	0-14

[1] G = gel; Mr = macroreticular; Mp = macroporous; HP = highly porous; P = porous
[2] Amberlyst exchanger
[3] Amberjet exchanger
[4] Marathon exchanger
[5] Monosphere exchanger

Resins
Cation Exchange Media

Comparable Strongly Acidic Cation Exchangers on Polystyrene

AMBERLITE	DIAION	DOWEX
200/252 [1]	PK228/PK216	
IR-118H[1], 31[1]		
IR-120 (H)	SK1B	HCR-S, HCR-W2
IR-122	SK110 SK104	HGR-W2 50Wx4
IR-124[1]	SK112L SK116	50Wx12[1] 50Wx16[1]
Amberjet 1200		G-26, 650C N-437[1], N-406

[1] Not available.

Amberlite Strong Cation Exchangers

Functional Group: sulfonic acid
Effective pH Range:0-14

QTY.	CAT. NO.	PRICE
Amberlite 200 Polystyrene, macroreticular Crosslinkage: 20% Form: sodium Applications: water conditioning; removal of heavy metals; decalcification of blood and extracorporeal transfusion (superior resistance to oxidation). Meets requirements of FDA Food Additive Regulation 21 CFR 173.25.		
1000g	06458-1KG	
IR120 Polystyrene, gel Crosslinkage: 8% Form: hydrogen Applications: wide variety of chemical process applications; removal of amino acids at low pH; USP potassium methods. Meets requirements of FDA Food Additive Regulation 21 CFR 173.25.		
500g	10322	
Amberlyst 15 (dry) Polystyrene, macroreticular Form: hydrogen Swelling (dry to solvent saturated, %) hexane: 10-15 toluene: 10-15 ethylene dichloride: 15-20 ethylene acetate: 30-40 ethylene alcohol: (95%) 60-70 water: 60-70 Applications: heterogeneous acid catalysis		
100g	10389	
Amberlite IRN77 Polystyrene, gel, Nuclear Grade Form: hydrogen , minimum of 99% exchange sites Applications: water treatment, RAD waste treatment; decontamination		
500g	10342	

HELPFUL HINTS

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Diaion Strong Cation Exchangers

Functional Group: sulfonic acid
Effective pH Range:0-14

Meet requirements of FDA Food Additive Regulation 21 CFR 173.25.

QTY.	CAT. NO.	PRICE
PK228L Polystyrene, porous Crosslinkage: 14% Form: sodium Applications: decolorization; softening and deionization of water; recovery and separation of metals; refining of chemicals, sugar and dextrose; catalyst; separation of amino acids (good stability against organic fouling and oxidation)		
1000g	13563	
SK116 Polystyrene, gel Crosslinkage: 16% Form: sodium Applications: pharmaceutical separations; size exclusion (good stability against oxidation)		
100g	13581	
UBK555 Polystyrene, gel Crosslinkage: 8% Form: calcium Particle Size: 200-240µm Applications: fructose/glucose chromatographic separation		
1000g	13968-U	

Dowex Strong Cation Exchangers

Functional Group: sulfonic acid
Effective pH Range:0-14

Meet requirements of FDA Food Additive Regulation 21 CFR 173.25 (unless otherwise noted).

QTY.	CAT. NO.	PRICE
50WX2		
Polystyrene, gel Crosslinkage: 2% Form: hydrogen		
Mesh Size: 50-100		
100g	217441-100G	
500g	217441-500G	
2500g	217441-2.5KG	
1 cubic foot	217441-1FT3	
Mesh Size: 100-200		
100g	217468-100G	
500g	217468-500G	
2500g	217468-2.5KG	
1 cubic foot	217468-1FT3	
Mesh Size: 200-400		
100g	217476-100G	
500g	217476-500G	
2500g	217476-2.5KG	
1 cubic foot	217476-1FT3	
50WX4		
Polystyrene, gel Crosslinkage: 4% Form: hydrogen		
Mesh Size: 50-100		
100g	428663-100G	
500g	428663-500G	
2500g	428663-2.5KG	
1 cubic foot	428663-1FT3	
Mesh Size: 100-200		
100g	422096-100G	
500g	422096-500G	
2500g	422096-2.5KG	
1 cubic foot	422096-1FT3	
Mesh Size: 200-400		
100g	217484-100G	
500g	217484-500G	
2500g	217484-2.5KG	
1 cubic foot	217484-1FT3	

Dowex Strong Cation Exchangers (cont'd)

QTY.	CAT. NO.	PRICE
50WX8		
Polystyrene, gel Crosslinkage: 8% Form: hydrogen Mesh Size: 50-100		
100g	217492-100G	
500g	217492-500G	
2500g	217492-2.5KG	
1 cubic foot	217492-1FT3	
Mesh Size: 100-200		
100g	217506-100G	
500g	217506-500G	
2500g	217506-2.5KG	
1 cubic foot	217506-1FT3	
Mesh Size: 200-400		
100g	217514-100G	
500g	217514-500G	
2500g	217514-2.5KG	
1 cubic foot	217514-1FT3	
DR-2030 (dry, made from Dowex M-31) Polystyrene, macroporous Form: hydrogen Applications: catalyst Does not meet FDA Food Additive Regulation 21 CFR 173.25		
100g	446483-100G	
500g	446483-500G	
5000g	446483-5KG	
1 cubic foot	446483-1FT3	
HCR-W2 Polystyrene, gel Crosslinkage: 8% Form: hydrogen		
1000g	I8880-1KG	
HCR-W2 Polystyrene, gel Crosslinkage: 8% Form: sodium Applications: mixed-bed applications; condensate polishing; demineralization; organic solvent desiccants; water softening (sodium form has high capacity for most organic liquids)		
1000g	13443	
Marathon C Polystyrene, gel. monodispersed Particle Size: 550µm Form: hydrogen Applications: demineralization		
1000g	433950-1KG	
Marathon MSC (previously known as MSC-1) Polystyrene, macroporous, monodispersed Particle Size: 520µm Form: hydrogen Applications: Water demineralization		
2500g	MSC1-2.5KG	
Monosphere 650C Polystyrene, gel Particle Size: 650µm Form: hydrogen Applications: mixed-bed applications; condensate polishing; sugar applications (Monosphere 650C material)		
1000g	13471-U	
Monosphere 650C UPW (purified 650C) Polystyrene, gel. Form: hydrogen Applications: demineralization for ultrapure water		
1000g	13340-U	
G-26 (same material as 650C, but mining grade) Polystyrene, gel Form: hydrogen Applications: chemical processing; mining. Does not meet FDA Food Additive Regulation 21 CFR 173.25		
100g	573663-100G	
500g	573663-500G	
5000g	573663-5KG	
1 cubic foot	573663-1FT3	

Dowex Strong Cation Exchangers (cont'd)

QTY.	CAT. NO.	PRICE
88 Polystyrene, macroporous Particle Size: 16-40 mesh Form: sodium Applications: deashing and mixed bed polishing of high fructose corn syrups		
1000g	436682-1KG	
2500g	436682-2.5KG	
Monosphere 88 Polystyrene, macroporous, monodispersed Particle Size: 550µm Form: sodium Applications: same as for Dowex 88.		
1000g	13709	
M-31 Polystyrene, macroporous Form: hydrogen Particle Size: 16-40 mesh Applications: catalyst Does not meet FDA Food Additive Regulation 21 CFR 173.25		
100g	573671-100G	
500g	573671-500G	
5000g	573671-5KG	
1 cubic foot	573671-1FT3	
Monosphere M-31 Polystyrene, macroporous, monodispersed Particle Size: 475µm Form: hydrogen Particle Size: 475µm Applications: same as for Dowex M-31 Does not meet FDA Food Additive Regulation 21 CFR 173.25		
1000g	13697	
Monosphere 99K/320 Polystyrene, gel, monodispersed Particle Size: 320µm Form: potassium Applications: chromatographic separations; sucrose recovery from beet and cane molasses (molasses desugarization or ion exclusion); separation of salts from polar organics; bulk deashing of process streams via ion exclusion chromatography; size exclusion separations of mono-, di-, and trisaccharides and other polar organics; betaine purification/recovery; basic amino acid recovery from sugar syrups and fractionation of basic amino acids; refining of polysaccharides to eliminate monosaccharides and low DP oligosaccharides		
1000g	13713	
Monosphere 99K/350 Polystyrene, gel, monodispersed Particle Size: 350µm Form: potassium Applications: same as for Monosphere 99K/320, but for high flow rate or deep bed applications where minimizing pressure drop is desired		
1000g	13717	
Monosphere 99Ca/320 Polystyrene, gel, monodispersed Particle Size: 320µm Form: calcium Applications: chromatographic separation of sugars, including specialty sugars and sugar alcohols; major industrial use is for separation of fructose from 42% high fructose corn syrup		
1000g	13721	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Resins
Cation Exchange Media

Weak Cation Exchangers on Polyacrylic Copolymer

EXCHANGER	CROSS LINK (%)	MATRIX[1]	MESH	IONIC FORM	MOISTURE (Approx. %)	MAX. OP. TEMP. (°C) [2]	TOTAL EXCHANGE meq/mL	CAPACITY meq/g	pH RANGE
AMBERLITE WEAK CATION EXCHANGERS (CARBOXYLIC ACID)									
CG-50 Type I	4	Mr	100-200	H	10	120	3.5	10.0	5-14
IRC50	4	Mr	16-50	H	48	100	3.5	10.0	5-14
IRC76	—	Mr	16-50	H	56	120	4.0	11.0	5-14
IRC86	—	G	16-50	H	50	120	4.2	10.7	4-14
DIAION WEAK CATION EXCHANGERS (CARBOXYLIC ACID)									
CWK30/S	—	P	30-60	H	49	120	4.5	—	4-14
WK10	—	P	16-50	H	56	150	2.5	—	5-14
WK11	—	P	16-50	H	48	150	2.9	—	5-14
WK40	—	HP	16-50	H	46	200	4.4	10.2	4-14
WK100	—	HP	16-50	H	49	120	2.8	9.0	4-14
WT01S	—	HP	100 -200µm	H	50	120	3.0	9.0	4-14
DOWEX WEAK CATION EXCHANGER (CARBOXYLIC ACID)									
MAC-3	—	Mp	16-50	H	47	120	3.8	10.8	4-14

Comparable Weakly Acidic Cation Exchangers on Polyacrylic Copolymer

AMBERLITE	DIAION	DOWEX
CG-50 Type I	WT01S	
DP-1[5], IRC-50	WK100	
IRC-76, IRC-84[4]	WK20[5], WK40	CCR-2[3], MWC-1[5]
IRC-84[5], IRC-86	WK20[5], WK40	CCR-3[3], MAC-3

[1] G = gel; Mr = macroreticular; Mp = macroporous; HP = highly porous; P = porous
[2] Amberlyst exchanger
[3] Amberjet exchanger
[4] Marathon exchanger
[5] Not available.

Amberlite Weak Cation Exchangers

Functional Group: carboxylic acid

Meet requirements of FDA Food Additive Regulation 21 CFR 173.25

QTY.	CAT. NO.	PRICE
CG-50 Type I (dry, fine mesh IRC-50)		
Acrylic, macroreticular Form: hydrogen Particle Size: 75-100µm Applications: cytochrome c isolation and purification; amines; drugs; metal ions; neutralization of solutions; thrombin		
500g	10319	
IRC50		
Acrylic, macroreticular Form: hydrogen Particle Size: 300-1200µm Applications: selectively adsorbs organic bases such as antibiotics, alkaloids, peptides, and amino acids; many proteins including higher molecular weights; neutralization of reaction mixtures; good all around use		
500g	10338	
IRC76		
Acrylic, macroreticular Form: hydrogen Applications: removal of ions associated with carbonate and bicarbonate alkalinity; deionization; softening		
500g	10340-U	

Diaion Weak Cation Exchangers

Functional Group: carboxylic acid

Meets requirements of FDA Food Additive Regulation 21FT3R 173.25

QTY.	CAT. NO.	PRICE
WT01S		
Acrylic, highly porous Form: hydrogen Particle Size: 100-200µm Applications: metal recovery; dealkalization; iron removal; refining of sugar; purification of antibiotics, pharmaceuticals, amino acids, etc. (superior kinetics and mechanical strength)		
100g	13593-U	
1000g	13595-U	

Dowex Weak Cation Exchanger

Functional Group: carboxylic acid

QTY.	CAT. NO.	PRICE
MAC-3		
Acrylic, macroporous Form: hydrogen Applications: water treatment; dealkalization; purification of antibiotics, pharmaceuticals, amino acids, etc.		
1000g	502545D	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Chelating Resins

EXCHANGER	CROSS LINK (%)	MATRIX[1]	MESH	IONIC FORM	MOISTURE (Approx. %)	MAX. OP. TEMP. (°C) [2]	TOTAL EXCHANGE meq/mL	CAPACITY meq/g	pH RANGE
AMBERLITECHELATING RESIN									
IRC-748	—	Mr	16-50	Na	65	90/70 [2]	1.25	4.4	1.5-14
IRA743	—	Mr	16-50	FB	≤58	100	0.6	—	0-10
DIAION CHELATING RESINS									
CR11	—	HP	16-50	Na	60	120/80[2]	0.35 (Ca)	1.2 (Ca)	4-10
CR20	—	HP	16-50	FB	55	100	0.28 (Ca)	0.91 (Ca)	6-10
CRB02	—	HP	16-50	amine	55	—	0.6	—	—
DOWEX CHELATING RESINS									
M4195	—	Mp	16-50	SO_4	62	60	35g Cu^{+2}/L	—	0-7
DUOLITE CHELATING RESINS									
C467	—	Mp	16-50	Na	62	65	1.0	3.5	1-10
GT73	—	Mp	16-50	H	55	121	1.2	3.9	1-13

[1] Mp = macroporous Mr = macroreticular HP = highly porous

[2] Na/H

Chelating Resins

QTY.	CAT. NO.	PRICE
Amberlite IRC-748		
Macroreticular Functional Group: iminodiacetic acid Form: sodium Applications: high affinity for heavy metal cations over alkali or alkaline earth metals; ideal for use in nonaqueous media		
100g	13296-U	
1000g	13297-U	
2500g	13298-U	
5000g	13299-U	
Amberlite IRA743		
Macroreticular Form: free base Applications: Removal of borate, boric acid, other boron species from water, highly selective; salts, including bases, do not interfere significantly		
25g	IRA743-25G	
100g	IRA743-100G	
500g	IRA743-500G	
Diaion CR11		
Highly porous Functional Group: iminodiacetic acid Form: sodium Applications: metal recovery; wastewater treatment; brine purification		
1000g	13547	
Diaion CRB02		
Highly porous Functional Group: glucamine Form: free amine Applications: high selectivity for borate ion; best for low levels, high flow		
1000g	13959-U	
Dowex M4195		
Macroporous Functional Group: bis-picolylamine Applications: removal of cobalt, copper, nickel; metal recovery; mining; general hydrometallurgy		
100g	13727-U	
500g	13728-U	
1000g	13729-U	
Duolite C467		
Macroporous Functional Group: amino-phosphonic Form: sodium Applications: metallic cations of low mass; removal of hardness from brine; catalyst (resistant to osmotic shock)		
500g	10353	
Duolite GT73		
Macroporous Functional Group: thiol Form: hydrogen Applications: removal of mercury, silver, lead, copper, cadmium		
500g	10354	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Resins
Ion Exchange (Mixed Bed) Media

Mixed Bed Resins on Polystyrene

EXCHANGER	CROSS LINK (%)	MATRIX[1]	MESH	IONIC FORM	MOISTURE (Approx. %)	MAX. OP. TEMP. (°C) [2]	TOTAL EXCHANGE meq/mL	CAPACITY meq/g	pH RANGE
AMBERLITE MIXED BED RESINS									
MB-150	—	G	16-50	H, OH	60	60	0.55	2.0	0-14
IRN150	8	G	16-50	H, OH	≤60	60	0.55	2.0	0-14
DIAION MIXED BED RESINS									
SMNUP	—	G	16-50	H, OH	60	60	—	—	0-14
SMT100	—	G	16-50	H, OH	60	60	—	—	0-14
DOWEX MIXED BED RESINS									
MR-3 LC NG	—	G	16-50	H, OH	60	60	1.7	—	0.14
Marathon MR-3	—	G	550-660µm	H, OH	60	60	1.4	—	0-14
MR-3 UPW[4]	—	G	600µm	H, OH	60	60	1.0	—	0-14
MR-450 UPW[4]	—	G	360, 590µm	H, OH	53	60	1.0	—	0-14
11A8 Retardion	—	G	35-80	NA[2]	45	70	NA[2]	NA[2]	0-14
OTHER RESINS									
TMD-8	—	G	16-40	H, OH	—	41	0.55[3]	0.80[3]	0-14

Comparable Mixed Bed Resins on Polystyrene

AMBERLITE	DIAION	DOWEX	OTHER
MB-1[5], MB-150	SMNUP	MR-3	—
MB-3[5]	—	—	TMD-8
IRN150	SMNUP	MR-3	—

[1] G = gel
[2] Not applicable
[3] Indicating; color changes (blue to amber) when capacity is reached.
[4] Monosphere resin
[5] Not available.

Mixed Bed Resins

QTY.	CAT. NO.	PRICE
Amberlite MB-150 Contains Amberlite 440 (OH) and IR-120 (H) resins. Applications: deionization.		
100g	13679	
1000g	13681	
Amberlite IRN150 Nuclear Grade Form: hydrogen and hydroxide, minimum of 99% and 95% exchange sites, respectivelyApplications: primary water chemistry control in once-through systems; useful in industrial water treatment where as-supplied resin must have absolute minimum of ionic and non-ionic contamination.		
500g	10341	
Diaion SMNUP (Mitsubishi) Nuclear Grade, contains Diaion SANUP (OH) and Diaion SKNUP (H) resins Applications: deionization; nuclear grade mixed bed for high quality water purification		
100g	13901	
1000g	13903-U	
MR-3 LC NG Nuclear Grade Form: hydrogen and hydroxide, minimum of 99.7% and 95% exchange sites, respectivelyApplications: low chloride, mixed bed resin for high quality water production in nuclear and industrial applications		
100g	13683-U	
1000g	13684-U	

QTY.	CAT. NO.	PRICE
Marathon MR-3 Form: hydrogen and hydroxide Applications: specially processed resin for mixed bed condensate polishing; useful for in-process demineralization.		
100g	13686-U	
1000g	13687-U	
Monosphere MR-450 UPW Particle Size: 360µm, 590µm Applications: ultrapure water		
1000g	13349-U	
Dowex 11A8 Retardation Form: contains paired anion and cation exchange sites Applications: removal of SDS, other ionic detergents from protein samples; desalting by SEC-type mechanism.		
100g	I6878-100G	
500g	I6878-500G	
TMD-8 A mixture of strong cation and anion resins Indicating resin: color changes from blue to amber when capacity is reached		
25g	M8157-25G	
100g	M8157-100G	
500g	M8157-500G	
1000g	M8157-1KG	

HELPFUL HINTS

Numerous Dow, Misubishi, and Rohm & Haas resins are available in the Supelco warehouse but not listed here. If a resin you need is not listed here, please contact your local Sigma-Aldrich representative with your requirements.

Nuclear Resins

EXCHANGER	CROSS LINK (%)	MATRIX[1]	MESH	IONIC FORM	MOISTURE (Approx. %)	MAX. OP. TEMP. (°C) [2]	TOTAL EXCHANGE meq/mL	CAPACITY meq/g	pH RANGE
AMBERLITENUCLEAR RESINS									
IRN-77	—	G	16-50	H[2]	≤55	121	1.8	5.0	0-14
IRN-78	—	G	16-50	OH[3]	≤60	60	1.1	4.0	0-14
IRN-150	—	G	16-50	H, OH	≤60	60	0.55	2.0	0-14
DIAION NUCLEAR RESINS									
SMNUP	—	G	16-50	H, OH	60	60	0.7	—	0-14
DOWEX NUCLEAR RESINS									
SBR LC NG	8	G	16-50	OH	≤60	60	1.1	—	0-14
MR-3 LC NG	—	G	16-50	H, OH	≤60	60	1.7	—	0-14

Comparable Nuclear Resins

AMBERLITE	DIAION	DOWEX
IRN-77	SAN 1[5]	SBR LC NG
IRN-78	SKN 1[5]	
IRN-150	SMN 1[5], SMNUP	MR-3 LC NG

[1] G = gel
[2] Minimum of 99% of exchange sites
[3] Minimum of 95% of exchange sites
[4] High porosity
[5] Not available from Supelco

Nuclear Resins

QTY.	CAT. NO.	PRICE
Amberlite IRN77 Polystyrene, gel, Nuclear Grade Form: hydrogen , minimum of 99% exchange sites Applications: water treatment, RAD waste treatment; decontamination		
500g	10342	
IRN78 Polystyrene, gel, Nuclear Grade Form: hydroxide, minimum of 95% exchange sites Applications: Water treatment, RAD waste, decontamination, useful for boron thermal regeneration.		
500g	10343	
Amberlite IRN150 Nuclear Grade Form: hydrogen and hydroxide, minimum of 99% and 95% exchange sites, respectively Applications: primary water chemistry control in once-through systems; useful in industrial water treatment where as-supplied resin must have absolute minimum of ionic and non-ionic contamination.		
500g	10341	
Diaion SMNUP (Mitsubishi) Nuclear grade, contains Diaion SANUP (OH) and Diaion SKNUP (H) resins Applications: deionization; nuclear grade mixed bed for high quality water purification		
100g	13901	
1000g	13903-U	
SBR LC NG Polystyrene, gel, Nuclear Grade Form: hydroxide, minimum of 95% exchange sites Applications: Water treatment, CVCS and radwaste demineralizers, reactor coolant treatment; useful for boric acid recovery		
100g	14035-U	
1000g	14036-U	
2500g	14037-U	
5000g	14038-U	
MR-3 LC NG Nuclear grade Form: hydrogen and hydroxide, minimum of 99.7% and 95% exchange sites, respectively Applications: low chloride, mixed bed resin for high quality water production in nuclear and industrial applications		
100g	13683-U	
1000g	13684-U	

HELPFUL HINTS

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Resins
Ion Exchange Media

Ion Exchange Media (Toyopearl)

Toyopearl ion exchange resins feature covalently bonded diethylaminoethyl (DEAE), carboxymethyl (CM), sulfopropyl (SP), or trimethylammonium (QAE and Q) groups attached to large pore size methacrylate particles. These materials ensure high resolution for a wide variety of proteins. In addition, they offer several other advantages:

- Sample capacity up to 2-4 times that of conventional gels
- High mechanical strength – you can use high flow rates
- Isocratic or gradient elution (bed volume will not change)
- Easily sanitized with acid, base, or heat

Toyopearl Resins for Ion Exchange Chromatography (all 250mL)

TOYOPEARL RESIN	PARTICLE SIZE (µm)	EXCHANGER TYPE (OPERATING pH)	EXCHANGE CAPACITY (meq/mL GEL)	ADSORPTION CAPACITY (mg/mL GEL)	CAT. NO.	PRICE
DEAE-650C	60-150	weak anion (2-10)	0.10 ±0.02	30 ±5[1]	807988	
DEAE-650M	40-90		0.10 ±0.02	30 ±5[1]	807473	
DEAE-650S	20-50		0.10 ±0.02	30 ±5[1]	807472	
Super Q-650M	40-90	strong anion (2-12)	0.20-0.30	143 [1]	817227	
Super Q-650S	20-50		0.20-0.30	143[1]	817223	
QAE-550C	60-150	strong anion (2-10)	0.37	70 [1]	814026	
CM-650M	40-90	weak cation	0.10 ±0.02	50 ±10 [2]	807475	
SP-650C	60-150	strong cation (3-11)	0.15 ±0.02	55 ±10 [3]	807994	
SP-650M	40-90		0.15 ±0.02	55 ±10 [3]	807997	
SP-550C	60-150		0.15	111[1]	814028	

LABPAK Ion Exchange Resin Kits[4]

LABPAK samplers enable you to try several Toyopearl resins to determine which works best for your particular application. Each kit contains several resins, grouped by separation mechanism.

KIT	RESIN	PARTICLE SIZE (µm)	EXCHANGER TYPE	CAT. NO.	PRICE
AIEXPAK Sampler 100mL each resin				843210	
	DEAE-650M	40-90	weak anion		
	QAE-550C	50-150	strong anion		
	Super Q-650M	40-90	strong anion		

[1] Adsorption capacity measured with: bovine serum albumin
[2] Adsorption capacity measured with: bovine hemoglobin
[3] Adsorption capacity measured with: lysozyme
[4] Exclusion limits (globular proteins): 550 type resins: 700,000 Dalton; 650 type resins: 5,000,000 Dalton.

HELPFUL HINTS

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