

## Ion Exchange Chromatography

Ion exchange is the most commonly practiced chromatographic method for purifying proteins, and inorganic or organic ions. Relative to other separations, it is widely applicable, easy to scale up, and low in cost. Ion exchange involves solute interactions with the charged groups of the packing material, followed by elution with an aqueous buffer of higher ionic strength or a change in pH.

The Supelco® Media Store offers a comprehensive range of ion exchangers, based on various matrices. Well known to the biochemist are agarose, cellulose, and dextran-based ion exchangers for low pressure applications. Methacrylate-based ion exchangers are increasingly being used in low to medium pressure applications. Our line of polystyrene-based resins includes ion exchangers from Rohm and Haas Co., The Dow Chemical Co., and Mitsubishi Chemical.

### Definitions

Gel or microreticular resins do not have true porosity. Instead, solute ions must diffuse through the particle to the ion exchange sites.

Macroreticular resins contain discrete pores that facilitate diffusion of the solute ions to the ion exchange sites. High molecular weight ions, which can only sparingly penetrate gel-type resins, have easier access to exchange sites in macroreticular beads. The sponge-like structure of macroreticular resins offers superior physical and chemical properties to those available with conventional gel-type resins.

A macroporous resin is a macroreticular resin with more than 20% crosslinkage.

### Simple Resin Selection

Product selection charts for each product group (strong anion exchange, weak anion exchange, strong cation exchange, and weak cation exchange) simplify the task of selecting the appropriate resin for your application. In addition, cross-reference charts compare similar (not necessarily equivalent) products from the different manufacturers.





# Products for Ion Exchange Chromatography

Type	Particle Size (µm)	Length (cm)	I.D. (mm)	Cat. No.
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## Ion Exchange Columns

### Discovery® BIO Columns

Discovery BIO PolyMA-SCX	5.0	5.0	4.6	59601-U
Discovery BIO PolyMA-WAX	5.0	5.0	4.6	59602-U

## Anion Exchange Media

Matrix	Brand Names/ Functionality	Properties/Limitations	Potential Applications
<b>Agarose</b> DEAE: 45-165 µm Q FF: 45-165 µm Q HP: 24-44 µm	Sepharose® DEAE CL-6B DEAE FF Q FF Q HP	Higher exclusion limits than Sephadex Autoclavable FF: extreme chemical & physical stability; high flow rate HP: high performance CL-6B Clean with 0.1 M NaOH DEAE CL-6B: low pressure	Q: Higher selectivity than DEAE. proteins; membrane proteins; polysaccharides; nucleic acids; high MW compounds DEAE CL-6B: widely used, well documented FF: initial cleanup; group separations HP: final polishing; high resolution
<b>Cellulose</b> 40-160 µm (microgranular)	DEAE Sephacel®	Low pressure; autoclavable Sephacel: no precycling or defining pH 2-9 Clean with 0.1 M NaOH	Proteins; nucleic acids; hormones; other biopolymers Sephacel: excellent alternative to fibrous forms
<b>Dextran</b> 40-125 µm	Sephadex® DEAE QAE	High capacity/price ratio Low pressure; autoclavable pH 2-9 Clean with 0.1 M NaOH A-50: bed volume changes with ionic strength	A-25: low MW proteins; polypeptides; nucleotides. High flow. A-50: batch separation; early steps; radioactive contamination. Lower flow rate. Widely used, well documented.
<b>Methacrylate</b> C: 60-150 µm M: 40-90 µm S: 20-50 µm	Toyopearl® DEAE QAE Q	Stable bed volume High mechanical strength Medium pressure (0.7 MPa) Large pores; high protein recovery pH 2-10 Clean with acid, base, heat	Enzyme/protein purification
<b>Polystyrene</b> strong anion most 16-50 mesh (297-1000 µm)	Types I & II Amberlite® Diaion™ Dowex®	Rigid; low back pressure Thermally & chemically stable; not compatible with strong oxidizers Range of functional groups, moisture content, capacity pH 1-14	Water purification; decolorization; demineralization; neutralization; pharmaceuticals; enzymes; catalysts; sugar refining
<b>Polystyrene</b> weak anion 16-50 mesh (297-1000 µm)	Amberlite Diaion alkylamine Dowex polyamine Duolite® polyamine	Rigid; low back pressure Thermally & chemically stable; not compatible with strong oxidizers Range of moisture content & capacity pH 1-7/9	Water purification; decolorization; demineralization; neutralization; pharmaceuticals; proteins; amino acids; refining



## Products for Ion Exchange Chromatography

Description	Matrix	Particle Size (µm)	Active Group	Cat. No.
<b>Strong Anion Exchange Media</b>				
<b>Amberlite®</b>				
Amberjet® 4200 chloride form	styrene-divinylbenzene (gel)	425-850	quaternary ammonium functional group	436747
Amberjet 4200 chloride form beads	styrene-divinylbenzene (gel)	425-850	quaternary ammonium functional group	517976
Amberlite CG-400-II p.a., Cl <sup>-</sup> -form, strongly basic,		200-400 mesh		06471
Amberlite CG-400 Cl <sup>-</sup> -form, strongly basic,		100-200 mesh		06438
Amberlite IRA-400 chloride form	styrene-divinylbenzene (gel)	16-50 mesh	quaternary ammonium functional group	247669
Amberlite IRA-410 chloride form	styrene-divinylbenzene (gel)	20-50 mesh	benzyltrimethyl (2-hydroxyethyl) ammonium functional group	216569
Amberlite IRA-410 chloride form strongly basic	styrene-divinylbenzene (gel)	20-50 mesh	benzyltrimethyl (2-hydroxyethyl) ammonium functional group	06433
Amberlite IRA-900 chloride form	styrene-divinylbenzene (macroreticular)	16-50 mesh		216585
Amberlite IRA-900 chloride form strongly basic	styrene-divinylbenzene (macroreticular)	16-50 mesh		06461
Amberlite IRA400 hydroxide form bucket of 500 g	styrene-divinylbenzene (gel)	16-50 mesh		501980
Amberlite IRA402 chloride form strongly basic	styrene-divinylbenzene (gel)	16-50 mesh	quaternary ammonium functional group	06466
Amberlite IRA404 chloride form	styrene-divinylbenzene (gel)	30-45 mesh		06477
Amberlite IRA458 chloride form	acrylic polymer (gel)	16-50 mesh		10330
Amberlite IRA910 chloride form pkg of 500 g	styrene-divinylbenzene (macroreticular)	16-50 mesh	dimethyl-ethanolamine functional group	10334-U
Amberlite IRA910 chloride form strongly basic	styrene-divinylbenzene (macroreticular)	16-50 mesh	dimethyl-ethanolamine functional group	06457
Amberlite IRA958 chloride form bucket of 500 g	acrylic copolymer (macroreticular)	16-50 mesh	quaternary ammonium functional group	10337
Amberlite® IRA958 chloride form strongly basic	acrylic copolymer (macroreticular)	13-45 mesh	quaternary ammonium functional group	06478
Amberlite IRN78 hydroxide form bucket of 500 g	styrene-divinylbenzene (gel)	16-50 mesh		10343-U
Amberlyst® A26 hydroxide form	styrene-divinylbenzene (macroreticular)	16-45 mesh	quaternary ammonium functional group	542571
Ambersep® 900 hydroxide form strongly basic,		20-50 mesh		06476



Description	Matrix	Particle Size (µm)	Active Group	Cat. No.
<b>Diaion™</b>				
Diaion HPA25 chloride form bucket of 1000 g	styrene-divinylbenzene (highly porous)	30-70 mesh	quaternary alkylamine functional group	13491-U
<b>Dowex®</b>				
Dowex 1×2 chloride form 100-200 mesh	styrene-divinylbenzene (gel)	100-200 mesh	trimethylbenzyl-ammonium functional group	217387
Dowex 1×2 chloride form 16-100 mesh, bucket of 1000 g	styrene-divinylbenzene (gel)	16-100 mesh	trimethylbenzyl-ammonium functional group	13367
Dowex 1×2 chloride form 200-400 mesh	styrene-divinylbenzene (gel)	200-400 mesh	trimethylbenzyl-ammonium functional group	217395
Dowex 1×2 chloride form strongly basic, 50-100 mesh	styrene-divinylbenzene (gel)	50-100 mesh	trimethylbenzyl-ammonium functional group	44290
Dowex 1×2 chloride form, p.a., 100-200 mesh	styrene-divinylbenzene (gel)	100-200 mesh	trimethylbenzyl-ammonium functional group	44296
Dowex 1×2 chloride form, p.a., 200-400 mesh	styrene-divinylbenzene (gel)	200-400 mesh	trimethylbenzyl-ammonium functional group	44299
Dowex 1×2 chloride form p.a., 50-100 mesh	styrene-divinylbenzene (gel)	50-100 mesh	trimethylbenzyl-ammonium functional group	44294
Dowex 1×4 chloride form	styrene-divinylbenzene (gel)	100-200 mesh		428590
Dowex 1×4 chloride form	styrene-divinylbenzene (gel)	20-50 mesh		428612
Dowex 1×4 chloride form	styrene-divinylbenzene (gel)	200-400 mesh		428604
Dowex 1×4 chloride form	styrene-divinylbenzene (gel)	50-100 mesh		44310
Dowex 1×8 chloride form	styrene-divinylbenzene (gel)	100-200 mesh		217425
Dowex 1×8 chloride form	styrene-divinylbenzene (gel)	50-100 mesh		217417
Dowex 1×8 chloride form	styrene-divinylbenzene (gel)	200-400 mesh		44340

Description	Matrix	Particle Size (µm)	Active Group	Cat. No.
Dowex® 1×8 chloride form, p.a., strongly basic	styrene-divinylbenzene (gel)	20-50 mesh		44324
Dowex 1×8 chloride form, p.a., strongly basic, 200-400 mesh	styrene-divinylbenzene (gel)	200-400 mesh		44339
Dowex 21K chloride form 16-30 mesh particle size (uniform)	styrene-divinylbenzene (gel)	16-30 mesh (uniform)		436658
Dowex 22 chloride form 20-40 mesh	styrene-divinylbenzene (macroporous)	16-50 mesh	dimethylethanolbenzyl ammonium functional group	436623
Dowex Marathon 11 chloride form strongly basic	styrene-divinylbenzene (gel)	20-50 mesh	trimethylbenzylammonium functional group	44425
Dowex Marathon A chloride form 30-40 mesh	styrene-divinylbenzene (macroporous)	30-40 mesh		433942
Dowex Marathon A2 chloride form 30-40 mesh	styrene-divinylbenzene (gel)	30-40 mesh		433934
Dowex Marathon MSA chloride form 20-50 mesh	styrene-divinylbenzene (macroporous)	20-50 mesh		428760
Dowex Monosphere 550A hydroxide form, 25-35 mesh (550 µm ± 50 µm)	styrene-divinylbenzene (gel)	25-35 mesh (550 µm ± 50 µm)		436607
Dowex SBR LCNG hydroxide form jar of 100 g	styrene-divinylbenzene (gel)	16-50 mesh		14035-U
Dowex SBR LCNG hydroxide form bucket of 1000 g	styrene-divinylbenzene (gel)	16-50 mesh		14036-U
Dowex SBR LCNG hydroxide form bucket of 2500 g	styrene-divinylbenzene (gel)	16-50 mesh		14037-U
Dowex SBR LCNG hydroxide form bucket of 5000 g	styrene-divinylbenzene (gel)	16-50 mesh		14038-U
Dowex SBR-C chloride form	styrene-divinylbenzene (gel)	16-45 mesh		573701

**Lewatit®**

Lewatit K-7333 hydroxide/palladium form		16-40 mesh	quaternary ammonium functional group	62086
Lewatit MonoPlus™ M 500 chloride form strongly basic		0.57 mm±0.05 mm		62096

**Weak Anion Exchange Media****Amberlite®**

Amberlite IRA-67 free base	Acrylic (gel)	16-50 mesh		476633
Amberlite IRA-67 free base	Acrylic (gel)	35-150 mesh		06411
Amberlite IRA-67 free base pkg of 500 g	Acrylic (gel)	16-50 mesh		10331
Amberlite IRA7-43 free base	styrene-divinylbenzene (macroreticular)	20-50 mesh	benzyltrialkylammonium functional group	216445
Amberlite IRA95 free base	styrene-divinylbenzene (macroreticular)	16-50 mesh	polyamine functional group	10425





Description	Matrix	Particle Size (µm)	Active Group	Cat. No.
Amberlite® IRA-96 free base macroreticular, 16-50 mesh (wet)	styrene-divinylbenzene (macroreticular)	16-50 mesh (wet)	polyamine functional group	A8709
Amberlite IRA-96 free base weakly basic	styrene-divinylbenzene (macroreticular)		polyamine functional group	06441
Amberlyst® A21 free base		20-50 mesh		216410
Duolite® A7 free base				436704

#### Diaion™

Diaion CRB02 free base	styrene-divinylbenzene (highly porous)	16-50 mesh		13959-U
Diaion WA10 free base	acrylic (gel)	16-50 mesh		13944-U
Diaion WA21J free base	styrene-divinylbenzene (highly porous)	16-50 mesh		13895
Diaion WA30 free base Pkg of 100 g	styrene-divinylbenzene (highly porous)	16-50 mesh		13541
Diaion WA30 free base	styrene-divinylbenzene (highly porous)	16-50 mesh		13543

#### Dowex®

Dowex 66 free base	styrene-divinylbenzene (macroporous)	16-50 mesh	polyamine functional group	436674
Dowex M-43 free base jar of 100 g	styrene-divinylbenzene (macroporous)	16-50 mesh		14031-U
Dowex M-43 free base bucket of 1000 g	styrene-divinylbenzene (macroporous)	16-50 mesh		14032-U
Dowex M-43 free base bucket of 2500 g	styrene-divinylbenzene (macroporous)	16-50 mesh		14033-U
Dowex M-43 free base bucket of 5000 g	styrene-divinylbenzene (macroporous)	16-50 mesh		14034-U
Dowex MWA-1 free base	styrene-divinylbenzene (macroporous)	35-75 mesh		44440
Dowex Marathon WBA free base 25-50 mesh	styrene-divinylbenzene (macroporous)	25-50 mesh	polyamine functional group	436666
Dowex Monosphere 66 free base	styrene-divinylbenzene (macroporous)			13705
Dowex Monosphere 77 free base	styrene-divinylbenzene (macroporous)			502529D

#### Lewatit®

Lewatit K 3433 free base, macroporous	styrene-divinylbenzene (macroporous)	500-1250 µm	tertiary ammonium functional group	62094
Lewatit MP-62 free base	styrene-divinylbenzene (macroporous)	300-1000 µm		62088
Lewatit MonoPlus™ MP 64 free base/chloride form	styrene-divinylbenzene (macroporous)	0.6 mm ± 0.1 mm	tertiary/quaternary ammonium functional group	84186

## Cation Exchange Media

Matrix	Brand Names/ Functionality	Properties/Limitations	Potential Applications
<b>Agarose</b> CM: 45-165 µm SP FF: 45-165 µm SP HP: 24-44 µm	Sepharose® CM CL-6B FF SP Sepharose FF HP	Higher exclusion limits than Sephadex® Autoclavable FF: chemically & physically stable HP: high performance Clean with 0.1 M NaOH CM: pH 6-10; S: pH 3-11	Proteins; polysaccharides; nucleic acids; membrane components; high MW compounds. Widely used; well documented. FF: initial cleanup; group separations. SP: higher selectivity than CM. HP: final polishing; high resolution
<b>Cellulose fibrous microgranular</b>	CM Phosphate	Microgranular: better flow & pressure stability	CM: highly basic materials
<b>Dextran</b> 40-120 µm	Sephadex CM SP	High capacity Low pressure; autoclavable Clean with 0.1 M NaOH CM: pH 6-10; SP: pH 2-10 C-50: bed volume changes with ionic strength	C-25: low MW proteins; polypeptides; nucleotides. High flow. C-50: batch separations; crude samples; early steps; radioactive contamination. Lower flow rate. Widely used, well documented.
<b>Methacrylate</b> C: 60-150 µm M: 40-90 µm S: 20-50 µm	Toyopearl® CM SP	Stable bed volume High mechanical strength Medium pressure (0.7 MPa) Large pores; high protein recovery Clean with acid, base, or heat CM: pH 5-10; SP: pH 3-11	Enzyme/protein purification
<b>Polystyrene</b> strong cation most 16-50 mesh (297-1000 µm)	Amberlite® Diaion™ Dowex® Duolite® SO <sub>3</sub> H	Rigid Thermally & chemically stable; not compatible with strong oxidizers Range of particle sizes, moisture content, capacity pH 1-14; 120° C/150° C maximum	Water conditioning; neutralization; amines; metals; pharmaceuticals; amino acids; catalysts; refining; deionization
<b>Polyacrylic</b> weak cation most 16-50 mesh (297-1000 µm)	Amberlite Diaion Dowex Duolite COOH	Rigid; low back pressure Thermally & chemically stable; not compatible with strong oxidizers Range of moisture content and capacity pH 4/5-14; 120° C maximum	Water conditioning; neutralization; amines; metals; proteins; amino acids; pharmaceuticals; peptides; deionization

Through our Cleaned-Certified-Packaged Media program, we can provide sterile, ready-to-use cartridges containing any of the LC media in our catalog. For more information about this program, see our current catalog.



# Products for Ion Exchange Chromatography



Description	Cat. No
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## Strong Cation Exchange Media

### Amberlite®

Amberjet® 1200 hydrogen form	436739
Amberlite 200 sodium form, strongly acidic, 20-50 mesh particle size	06437
Amberlite 200C sodium form, strongly acidic	06458
Amberlite CG-120-II p.a., hydrogen form, strongly acidic, 200-400 mesh	17978
Amberlite CG-120-II p.a., sodium form, strongly acidic, 200-400 mesh	06469
Amberlite CG-120-I sodium form, 120-500 mesh	06468
Amberlite CG-120 sodium form, strongly acidic, 100-200 mesh	06420
Amberlite IR120 hydrogen form bucket of 500 g	10322
Amberlite IR120 hydrogen form strongly acidic	06428
Amberlite IR120 sodium form	224359
Amberlite IRN77 hydrogen form	10342
Amberlyst® 15 hydrogen form, dry, moisture ≤1.5%	216380
Amberlyst 15 hydrogen form, dry, moisture <2%	10389
Amberlyst 15 hydrogen form, dry, moisture ~5%	06423
Amberlyst 15 hydrogen form, wet, moisture ~48%	216399

### Diaion™

Diaion PK228L sodium form pkg of 1000 g	13563
Diaion SK116 sodium form	13581

### Dowex®

Dowex 50W×2, p.a., sodium form, 50-100 mesh	44463
Dowex 50W×2 p.a., hydrogen form, strongly acidic, 200-400 mesh	44464
Dowex 50W×4, p.a., sodium form, 200-400 mesh	44473
Dowex 50W×8, p.a., hydrogen form, strongly acidic, 20-50 mesh	44504
Dowex 50W×8 p.a., hydrogen form, strongly acidic, 200-400 mesh	44519
Dowex 50W×8 p.a., hydrogen form, strongly acidic, 50-100 mesh	44509
Dowex 50W×2 hydrogen form 100-200 mesh	217468
Dowex 50W×2 hydrogen form 200-400 mesh	217476
Dowex 50W×2 hydrogen form 50-100 mesh	217441
Dowex 50W×4 hydrogen form 100-200 mesh	422096
Dowex 50W×4 hydrogen form 200-400 mesh	217484
Dowex 50W×4 hydrogen form 50-100 mesh	428663
Dowex 50W×8 hydrogen form 100-200 mesh	217506
Dowex 50W×8 hydrogen form 200-400 mesh	217514
Dowex 50W×8 hydrogen form 50-100 mesh	217492
Dowex 50W×8, p.a., sodium form, strongly acidic, 100-200 mesh	44514
Dowex 88 sodium form	436682
Dowex DR-2030 hydrogen form	446483
Dowex G26 hydrogen form	573663

Description	Cat. No
Dowex® HCR-W2 hydrogen form	428701
Dowex M-31 hydrogen form	573671
Dowex Marathon C hydrogen form 30-40 mesh	433950
Dowex Marathon MSC hydrogen form 20-50 mesh	428787
Dowex Marathon MSC sodium form	591807
Dowex Monosphere® 650C UPW hydrogen form	13340-U
Dowex Monosphere 88 sodium form	13709
Dowex Monosphere 99Ca/320 calcium form	13721
Dowex Monosphere M-31 hydrogen form bucket of 1000 g	13697
Dowex Monosphere 650C hydrogen form 25-30 mesh uniform particle size	436615

### Lewatit®

Lewatit K-2629 hydrogen form particles (spherical)	62084
Lewatit MonoPlus™ S 100 sodium form	03953
Lewatit MonoPlus SP 112 sodium form	62102

## Weak Cation Exchange Media

### Amberlite®

Amberlite CG50 (Type I) hydrogen form	06435
Amberlite CG50 (Type I) hydrogen form bucket of 500 g	10319
Amberlite CG50 (Type II) hydrogen form	06467
Amberlite IRC50 hydrogen form pkg of 500 g	10338
Amberlite IRC76 hydrogen form bucket of 500 g	10340-U
Amberlite IRC86 hydrogen form weakly acidic	06455
Amberlite IRP-64 hydrogen form	274267

## Other Ion Exchange Media

### Sephadex®

CM Sephadex C-25	C25120
CM Sephadex C-50	C50120
DEAE-Sephadex A-25 chloride form	A25120
QAE Sephadex A-25 chloride form	Q25120
QAE Sephadex A-50 chloride form	Q50120
SP Sephadex C-50 sodium form	SPC50120



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