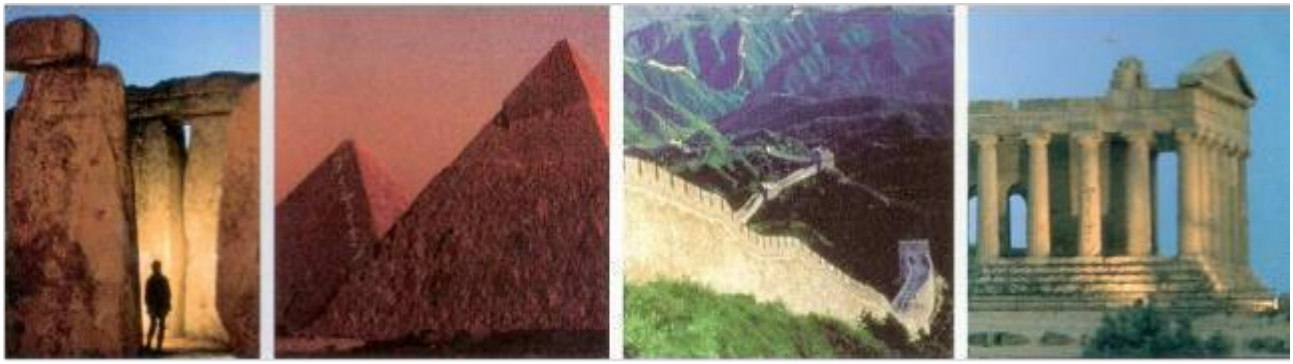

DIAION™
RELITE™
SEPABEADS™
MCI GEL®

ITOCHU Chemicals America
2019-02
Industrial and Preparative Ion Exchange Resin & Synthetic Adsorbent Catalog

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Strongly Acidic Cation Exchange Resins

Strong acid cation exchange resins have a crosslinked polystyrene matrix with sulfonic acid functional groups. There are SK-grade of gel type and PK-grade of porous type. The standard shipping form is sodium salt. In some cases, the hydrogen form is available for demineralization applications.

SK1B resin is our "flagship" premium grade, gel-type, strong acid cation resin. It has excellent properties for industrial applications and is recommended for industrial scale softening and demineralization. It is a standard 8% crosslinked resin. In situations where the raw water contains oxidizing agents, higher crosslinked resins such as SK110 and SK112 are recommended as they provide better performance and longer operating life. SK110 is also recommended for regenerable mixed bed applications

The PK resin grades are based on a porous styrene DVB polymer matrix. Their porous structure provides excellent durability against osmotic shock caused by swelling and shrinkage. PK216 is recommended for general water treatment. The higher crosslinked PK228 is recommended for condensate demineralization (L grade is recommended for best pressure flow performance). PK grades area also recommended for special applications such as deashing and decolorization.

Grade	Diaion SK1B	Diaion SK110	Diaion SK112
Matrix Type	Gel (styrene/DVB), SO_3^- Na^+		
Counter Ion	Na	Na	Na
Total Capacity (meq/ml-R)	>2.0	>2.0	>2.1
Moisture Content (%)	43-50	35-45	32-42
Shipping Density (grams/L)	790	850	860
Particle Size Distribution	On 1180 um: 5% max Through 300 um: 1% max		
Effective Size	0.40 min		
Uniformity Coefficient	1.6 max		
Whole Bead Count	90% min		
Operating Temperature	120°C max		
Crosslinkage %	8	10	12

Grade	Diaion PK208	Diaion PK212L	Diaion PK216	Diaion PK220	Diaion PK228	Indion 730H
Matrix Type	Porous (styrene/DVB), SO_3^- Na^+					
Counter Ion	Na	Na	Na	Na	Na	Na
Total Capacity (meq/ml-R)	>1.2	>1.5	>1.75	>1.9	>2.05	>1.7 H form
Moisture Content (%)	58-68	52-58	46-52	41-47	37-43	54-57
Shipping Density (grams/L)	780	780	790	800	810	740
Particle Size Distribution	On 1180 um: 5% max Through 300 um: 1% max					
Effective Size	0.40 min					
Uniformity Coefficient	1.6 max					
Whole Bead Count	90% min					
Operating Temperature	120°C max					
Crosslinkage %	4	6	8	10	14	8

Uniform Strong Acidic Cation Exchange Resins

The UBK grade of cation exchange resins are made by a uniform bead polymerization technique. These resins have a very low uniformity coefficient with all beads being of equal particle size. Highly uniform resins generally use less chemical and provide lower pressure drops due to the uniformity of the resin throughout a column.
Resins from 4% -16% crosslinkages are offered. UBK16 has a very high (16%) crosslinkage. It is used in special process applications like nuclear and pharmaceutical purification. .

Grade	Diaion UBK04	Diaion UBK08	Diaion UBK08A	Diaion UBK10	Diaion UBK14MH	Diaion UBK16
Matrix Type	Gel (styrene/DVB), $SO_3^- Na^+$					
Counter Ion	Na	Na	Na	Na	Na	Na
Total Capacity (meq/ml-R)	>1.3	>2.0	>2.0	>2.2	>2.4	>2.3
Moisture Content (%)	57-67	43-49	43-49	38-44	37-43	27-37
Shipping Density (grams/L)	790	840	840	850	860	856
Particle Size Distribution	550 +/-50	600 +/-50	600 +/-50	650 +/-50	550 +/-50	600 +/-50
Uniformity Coefficient	1.2 max	1.1 max	1.2 max	1.1 max	1.2 max	1.2 max
Whole Bead Count	95% min					
Operating Temperature	120°C max					
Crosslinkage %	4	8	8	10	14+	16

Type I Strongly Basic Anion Exchange Resins

Diaion Strong base anion exchange resins are based on crosslinked polystyrene matrix having quaternary ammonium groups (NR_3^+). Among the Diaion product lines, there are SA-grades of gel type, PA-grades of porous type, and HPA-grades of highly porous-type. The standard shipping is Cl^- form (in some cases OH^- form is available). Type I resins have trimethyl ammonium groups which impart higher basicity. In the co-current regeneration mode, the treated effluent water will have the lowest silica leakage. Type I resins also have higher chemical stability and can be applied at higher temperature than Type II or acrylic based resins.

SA10A is a Type I resin with standard crosslinkage. SA12A is a Type I resin with slightly lower crosslinkage and typically recommended for treatment of surface waters with troublesome organic content. These resins are mainly used for water treatment. SA11A is a Type I resin with low crosslinkage used for special applications such as high organic removal or as a primary bed polisher anion. NSA100 is a gel Type I resin with high crosslinkage. It is used for special applications such as iodine isolation from brine.

Porous ion exchange resins with their porous polymer matrix, have good resistance against swelling and shrinking. Their exchange capacity is lower than gel-type ion exchange resins with the same degree of crosslinkage. These resins are effective when highly purified effluents are needed, e.g. removal of silica to very low concentration. They are suitable for treatment of waste waters with organic compounds. PA312 and PA316 are generally used in waste water treatments, and PA308 is used for demineralization and decolonization of sugar liquors.

Grade	**Diaion SA10A**	**Diaion SA11A**	**Diaion SA12A**	**Diaion NSA100**
Matrix Type	Gel (styrene/DVB) --Type I -- $R\text{-}CH_2\text{-}N(CH_3)_3^+$			
Counter Ion	Cl	Cl	Cl	Cl
Total Capacity (meq/ml-R)	>1.3	>0.85	>1.3	>1.3
Moisture Content (%)	43-47	55-65	48-55	37-42
Shipping Density (grams/L)	670	690	670	690
Particle Size Distribution	On 1180 um: 5% Max Through 300 um: 1% max			
Uniformity Coefficient	1.6 max.			
Whole Bead Count	95% min			
Operating Temperature (OH/ Cl)	60°C / 80°C			

Grade	**Diaion PA306S**	**Diaion PA308**	**Diaion PA312**	**Diaion PA316**	**Diaion PA318L**
Matrix Type	Porous (styrene/DVB) --Type I -- $R\text{-}CH_2\text{-}N(CH_3)_3^+$				
Counter Ion	Cl	Cl	Cl	Cl	Cl
Total Capacity (meq/ml-R)	>0.8	>1.0	>1.2	>1.3	>1.3
Moisture Content (%)	66-76	57-67	49-55	44-50	42-48
Shipping Density (grams/L)	720	710	680	670	
Particle Size Distribution	150um-425um	On 1180 um: 5% Max Through 300 um: 1% max			5%max on 1180um 5%max thru 420um
Uniformity Coefficient	1.6 max.				
Whole Bead Count	95% min				
Operating Temperature (OH/ Cl)	60°C / 80°C				
Crosslinkage %	3	4	6	8	9

Uniform Type I Strong Base Anions

The UBA grade of anion exchange resins are made by a uniform bead polymerization technique. These resins have a very low uniformity coefficient with all beads being of equal particle size. Highly uniform resins generally use less chemical and provide lower pressure drops due to the uniformity of the resin throughout a column
The UBA100 is the uniform version of the guassian SA10A while the UBA120 and UBA120A are equivalent to the SA12A. UBA150 is a high capacity strong base anion with low moisture content

Grade	**Diaion UBA100**	**Diaion UBA120**	**Diaion UBA120A**	**Diaion UBA150**
Matrix Type	Gel (styrene/DVB) --Type I -- $R\text{-}CH_2\text{-}N(CH_3)_3^+$			
Counter Ion	Cl	Cl	Cl	Cl
Total Capacity (meq/ml-R)	>1.35	>1.3	>1.3	>1.4
Moisture Content (%)	43-49	49-55	49-55	39-45
Shipping Density (grams/L)	670	680	680	700
Particle Size Distribution	550 +/-50	575 +/-50	575 +/-50	600 +/-50
Uniformity Coefficient	1.10	1.10	1.2	1.10
Whole Bead Count	90% min	95% min	95% min	95% min
Operating Temperature (OH/ Cl)	$60^{\circ}C$ / $80^{\circ}C$			
Crosslinkage %				

Type II Strongly Basic Anion Exchange Resins

Type II resins have dimethylethanol ammonium groups which impart slightly lower basicity versus Type I anions. This provides an advantage of easier regeneration than type I and a higher throughput capacity.

SA20A is type II gel resin of standard crosslinkage. It is typically used in water treatment due to its ease of regeneration. UBA200 is a uniform type 2 gel anion resin.

Porous-Type II resins have better efficiency during regeneration though they have lower basicity and chemical stability than Type I anions. PA418 is generally used in water treatment while PA408 and Relite JA420 are used to demineralize and to decolorize sugar liquors.

Grade	Diaion UBA200	Diaion SA20A	Diaion PA408	Diaion PA412	Diaion PA418	Relite JA420
Matrix Type	Gel (styrene/DVB) --Type II -- $R\text{-}CH_2\text{-}N(CH_3)_2(CH_3CH_2OH)^+$		Porous (styrene/DVB) --Type II -- $R\text{-}CH_2\text{-}N(CH_3)_2(CH_3CH_2OH)^+$			
Counter Ion	Cl	Cl	Cl	Cl	Cl	Cl
Total Capacity (meq/ml-R)	>1.3	>1.3	>0.9	>1.1	>1.3	>1.0
Moisture Content (%)	45-52	45-52	54-64	46-52	38-44	54-61
Shipping Density (grams/L)	715	700	720	690	670	670
Particle Size Distribution	575 um +/- 50	On 1180 um: 5% Max Through 300 um: 1% max				
Uniformity Coefficient	1.1 max	1.6 max				
Whole Bead Count	90% min	90% min	95% min	95% min	95% min	90% min
Operating Temperature (OH/ Cl)	40^oC / 60^oC					
Crosslinkage %			4	6	9	

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Highly Porous Strongly Basic Anion Exchange Resins

The HPA series of resins are unique strong base anions with a very highly porous matrix. The resins are ideally suited for enzyme immobilization, protein purification and decolorizing applications. The resins are provided in both Type I and Type II chemistries

Grade	Diaion HPA25L	Diaion HPA25M	Diaion HPA512L	Diaion HPA75	Diaion HPA716
Matrix Type	Highly Porous (styrene/DVB) Type I $R\text{-}CH_2\text{-}N(CH_3)_3^+$			Highly Porous (styrene/DVB) Type II $R\text{-}CH_2\text{-}N(CH_3)_2(CH_3CH_2OH)^+$	
Counter Ion	Cl	Cl	Cl	Cl	Cl
Total Capacity (meq/ml-R)	>0.5	>0.5	>0.7	>0.5	>0.7
Moisture Content (%)	58-68	58-68	63-73	56-66	58-68
Shipping Density (grams/L)	680	690	670	660	650
Effective Size (mm)	0.25	0.25	0.45	0.25	0.4
Uniformity Coefficient	1.6 max				
Whole Bead Count	95 min				
Operating Temperature (OH/ Cl)	60^oC / 80^oC			40^oC / 60^oC	

Weakly Acidic Cation Exchange Resins

WK10 grades (methacrylic type) are weak acid cation exchange resins having carboxylic acid functionalities. They have a pK value of approximately 6. WK10 has a high reaction rate, and WK11 has a high totally exchange capacity. These methacrylic grades are mainly used for special applications such as purification of pharmaceuticals, foods, and organic chemicals. This resin is also offered in a smaller particle size called WK10S where higher purity/recoveries are required.

WK100 and WT01S have high reaction rates and high adsorption capacity. They are mainly used for the purification of pharmaceuticals and foods. WT01S is offered in 100-300 µm particle distribution designed for high performance processing.

WK40L and WK60L are weak acid cation exchange resins with carboxylic acid functionality based on porous acrylic polymer matrix. They have a pK value of approximately 5.3. The acrylic type resins have higher total capacity than methacrylic type resins. They are mainly used for water treatment applications such as the removal of hardness ions in the presence of bicarbonate alkalinity.

Grade	Diaion WK10	Diaion WK11	Diaion WK100	Diaion WT01S	Diaion WK10S
Matrix Type	Porous -- Methacrylic Carboxylic Acid				
Counter Ion	H	H	H	H	H
Total Capacity (meq/ml-R)	>2.5	>2.9	>2.8	>3.0	>2.5
Moisture Content (%)	53-59	45-52	45-55	45-55	50-60
Shipping Density (grams/L)	630	670	650	720	720
Particle Size Distribution	On 1180 um: 5%max Through 300 um: 1% max			>85% between 300um - 106 um	230um mean size
Uniformity Coefficient	1.6 max				
Whole Bead Count	95% min				
Operating Temperature	150°C max				
Swelling (H-->Na) %	47	63	70	42	42

Grade	Diaion WK40L	Relite WK60L
Matrix Type	Porous -- Acrylic Carboxylic Acid	
Counter Ion	H	H
Total Capacity (meq/ml-R)	>4.4	>4.4
Moisture Content (%)	41-48	45-52
Shipping Density (grams/L)	770	770
Particle Size Distribution	On 1180 um: 5%max Through 300 um: 1% max	
Uniformity Coefficient	1.6 max	
Whole Bead Count	95% min	
Operating Temperature	120°C max	
Swelling (H-->Na) %	73	58

Weakly Basic Anion Exchange Resins

WA10 resin is based on a gel-type acrylic polymer matrix. It has a tertiary amine functionality with high regeneration efficiency. The acrylic polymer matrix provides good chemical stability and good resistance to organic fouling. WA10 is mainly used for pretreatment of starch hydrolysates, beet sugar solutions, and formaldehyde.

WA20 and WA21J do not have any neutral salt splitting capacity. They have high total exchange capacity and high regeneration efficiency. The porous styrene polymer imports high chemical stability, high mechanical strength against attrition, high thermal stability, and high durability against organic fouling. These resins are used for the removal of strong mineral acids in standard water treatment applications. They can also be applied in special process separations such as the treatment of organic solvents.

WA30 and Relite JA300 resin are weak base anion exchange resin based on porous, styrene-DVB polymer matrix with dimethyl amine functionality. The high porous styrenic matrix has excellent chemical stability, mechanical and osmotic strength, high thermal stability, and durability against organic fouling. It is used for a variety of applications, such as removal of organic substances of high molecular weight, pretreatment of raw waters containing organic foulants, deionization and decolorization of starch hydrolysates, and purification of glycerine and enzymes.

WA55 is a unique weak anion resin of Mitsubishi Chemical. The total capacity is equally divided between strong base functionality (quaternary amine) and weak base functionality (tertiary amine). This resin is used in the production of demineralized whey enriched with proteins. With whey containing approximately 50 g/l lactose, proteins, beta-carotene, amino acids, organic acids and mineral salts, the anions and organic acids are removed by WA55 with a minimum loss of protein and reversible adsorption of beta-carotene.

Grade	Diaion WA10	Diaion WA20	Diaion WA21J	Diaion WA30	Relite JA300	Diaion WA55
Matrix Type	Gel - Acrylic/DVB - Tertiary Amine	Porous - Styrene/DVB - polyamine		Porous - Styrene/DVB - Tertiary Amine		Porous - Styrene/DVB - Tertiary/Quarternary Amine
Counter Ion	Free Base	Free Base	Free Base	Free Base	Free Base	Free Base
Total Capacity (meq/ml-R)	>1.2	>2.5	>2.0	>1.5	>1.5	1.1 - 1.3
Moisture Content (%)	63-69	39-45	40-52	43-55	47-55	60-65
Shipping Density (grams/L)	690	660	650	630	640	690
Particle Size Distribution	On 1180 um: 5%max Through 300 um: 1% max					
Uniformity Coefficient	1.6 max					
Whole Bead Count	95% min					
Operating Temperature	60°C max	100°C max	100°C max	100°C max	100°C max	100°C max
Swelling (FB --> Cl) %	22	19	23	21	20	20

Porous Methacrylate Weakly Basic Anion Exchange Resins

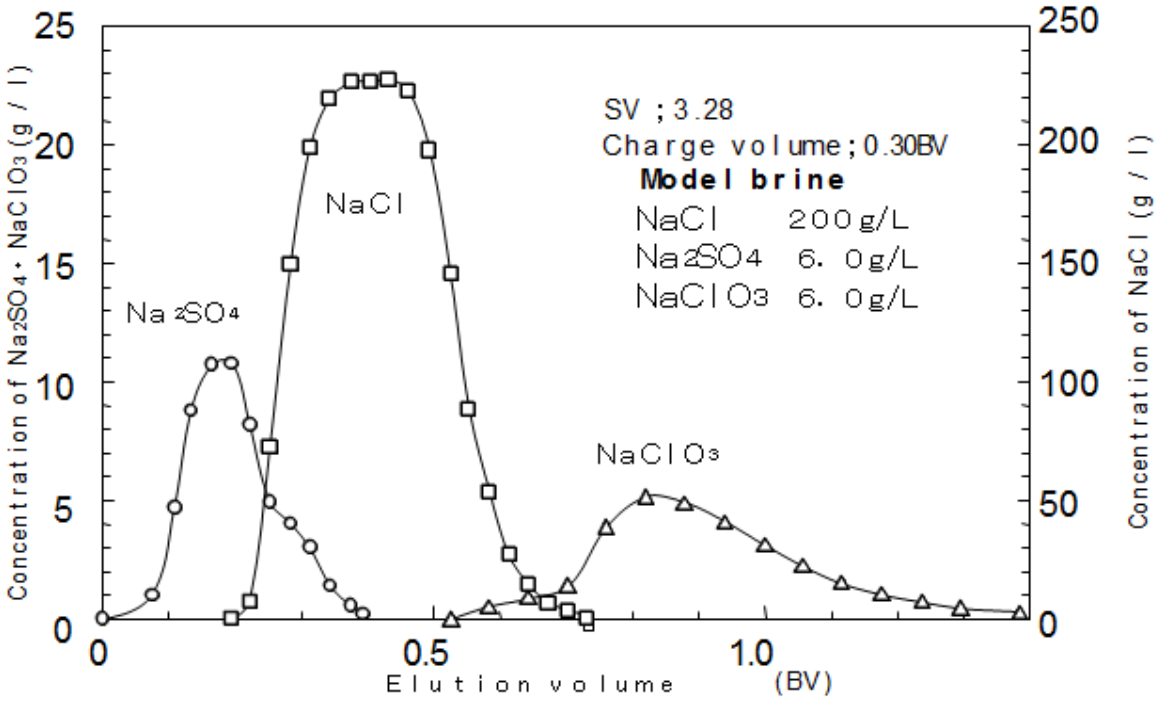
Sepabeads FP-DA13 is a highly porous methacrylate based anion exchange resin used in the purification of bio-polymers. The methacrylate base matrix provides a hydrophilic nature in a rigid polymer structure. The resin has very little swell and shrinkage in all solvents

Grade	**Sepabeads FP-DA13**
Matrix Type	Porous Methacrylate Weak Base anion
Counter Ion	diethylamino
Total Capacity (meq/ml-R)	>0.7
Moisture Content (%)	53-63
Shipping Density (grams/L)	720
Particle Size Distribution	5% max >212um 2% max thru 75um
Uniformity Coefficient	1.6 max
Surface Area (m^2/gram)	40
Pore Volume (mL/gram)	1.0
Pore Radius (A^o)	470

Amphoteric Resins

AMP03 is a gel matrix amphoteric resin containing both weakly acidic and strongly basic functionalities. This resin is recommended for ion retardation chromatography and has been applied to remove salts from organic solutions

Grade	Diaion AMP03
Matrix Type	Gel, Styrene/DVB
Functional Groups	Quarternary Amine & Carboxylate
Total Capacity (meq/ml-R)	>0.75
Salt Splitting Capacity (meq/ml)	0.0015 max
Shipping Density (grams/L)	760
Particle Size Distribution	240-280 micron (85% min)
Effective pH Range	4 - 10
Max Operating Temperature (°C)	100
Shipping Density (grams/L)	760
Particle Density (g/ml)	1.09



Chelating Resins

Iminodiacetate Type: CR11 is based on a high porous styrenic matrix, and provides rapid kinetics, high operating capacity, low swell / shrink ratio, and excellent mechanical stability. CR11 captures metal ions by chelation with its iminodiacetate functionality. CR11 has a higher selectivity than strong and weak acid cation exchange resins for divalent ions, especially transitional metal elements such as copper, Iron, etc… CR11 can capture metal ions at much lower pH than strong and weak acid resins. As CR11 has higher selectivity for divalent metal ions than monovalents, it can be used for these selective separations.

Polyamine Type: CR20 is a unique chelating resin with polyamine functionality. CR20 captures metal ions by chelation using its polyamine functionality. CR20 has a high porous styrene-DVB matrix and a high selectivity to heavy and transitional metal ions. It does not absorb alkali metal and alkali earth metal ions, and therefore, it can be used for heavy metal recovery from highly concentrated alkali earth solutions.

Relite JS020 is an aminophosphonic chelating resin. JS020 is used in applications such as decalcification of secondary brine in the chloroalkali industry

Glucamine Type: CRB03 and CRB05 are special chelating resin with glucamine groups based on a high porous styrene-DVB matrix. They have high selectivity for borate ions and are used for borate separation from various solutions, including brine and sea water.

Grade	Diaion CR11	Diaion CR20	Relite JS020	Diaion CRB03	Diaion CRB05
Matrix Type	Porous Styrene/DVB -- iminodiacetate -- $CH_2N(CH_2COONa)_2$	Porous Styrene/DVB -- polyamine -- $CH_2NH(CH_2CH_2NH)_nH$	Styrene/DVB -- amino phosphonic	Porous (styrene/DVB) --Glucamine -- CH2N(CH3)CH2(CHOH)4CH2OH	
Counter Ion	Na	free base	Na	free base	free base
Total Capacity (meq/ml-R)			>2.0	>0.7	>0.95
Moisture Content (%)	55-65	50-60	60-67 (H form)	45-55	43-53
Shipping Density (grams/L)	730	640	750	670	750
Particle Size Distribution	On 1180 um: 5% Max Through 300 um: 1% max			On 850 um: 10% max Through 300 um: 1% max	
Uniformity Coefficient	1.6 max				
Whole Bead Count	95% min				
Operating Temperature	80°C max H form 120°C max (Na form)	100°C max (free base)	75°C Max	100°C max (free base)	100°C max (free base)
Cu Adsorption Capacity (mmole/ml-R)	>0.5	>0.4			

Ultrapure Ion Exchange Resins

Mitsubishi Chemical offers several grades of mixed bed resins for non-regenerable mixed bed ion exchange applications. All mixed resins are typically offered in a 1:1 stoichiometric ratio (1 equivalence of cation equilibrium capacity to 1 equivalence of anion equilibrium capacity).

The Diaion SMNUPB mixed resin is offered for critical applications which require high purity treated water. This mixed resin is prepared from component resins which have been prepared with a high degree of purity and conversion to the H/OH form. Diaion SMNUPB if often supplied for applications which require nuclear grade resin.

SMT100L and SMT200L are manufactured to very stringent performance specifications, and prepared from component resins with the highest degree of conversion and consideration of purity. These resins will provide exceptional performance relative to electrical resistivity and TOC leakage. In fact, rinse to 18 megaohm resistivity is near instantaneous, and clearly superior to conventional mixed bed resins. The performance for TOC meets or exceeds all conventional mixed bed resins. The TOC rinse down performance is maintained over 12 month's storage.

Diaion SMT200L also offers remarkable performance relative to metals leakage. The cation component, SKT20L, has been prepared using low levels of metals in the resin phase (500 ppb). This improvement allows ppt metals leakage in the product water quality (actual performance is <0.1 ppt for 13 metals within 4 hrs of rinse).

Grade	Diaion SMNUPB	Diaion SMT100L	Diaion SMT200L
Matrix Type	Gel --Styrene/DVB --		
Conversion (eq%)	95 H form >90 OH form	>99.9 H form >90.0 OH form <1.0 Cl form	
Total Capacity (meq/ml-R)	>1.7 Cation >0.9 Anion		
Moisture Content (%)	50-60 Cation 55-65 Anion	50-60 Cation 62-72 Anion	
Effective Size	0.40 min		
Particle Size Distribution	On 1180 um: 5% max Through 300 um: 1% max		
Uniformity Coefficient	1.6 max		
Resistivity (MΩ.cm)	>15 (5 min) >17.5 (30 min)	>18 (3 hrs)	>18.1 (12 hrs)
TOC (ppb)	<10	<10	<1 (12 hrs)
Particles (>0.05 um/ml)			<10 (12 hrs)

*Test condition: Feed of 18.1 m ⦸• cm to 1500ml resin packed in 50mm ✐ x 1000mmH column at SV 20. Resistivity measured by DKK: AQ-11; TOC by Anatel A-100PSE.

More Ultrapure Ion Exchange Resins

Diaion SKT10L is a premium grade, gel-type strong acid cation exchange resin based on a crosslinked polystyrene matrix with sulfonic acid functional groups. Diaion SKT10L is prepared in the hydrogen form with special attention to resistivity rinse up, TOC and metal leachables. Diaion SKT10L is used as the cation component for Diaion SMT100 non-regenerable mixed bed resin. This ultra-high-purity mixed bed resin is recommended for semiconductor plant final polishing loop applications. An improved copolymerization process provides low level TOC leachables. SKT10L is remarkable for its extremely low content of ionic contaminants in the resin phase. Diaion SKT10L is recommended for critical applications requiring low metal leakage.

Diaion SAT10L is a premium grade, gel-type strong base, Type I, anion exchange resin based on a crosslinked polystyrene matrix with quaternary ammonium functional groups. Diaion SAT10L is prepared with an extremely high conversion to the hydroxide form with special attention to resistivity rinse up, TOC and metal leachables. Diaion SAT10L is used as the anion component for Diaion SMT100 non-regenerable mixed bed resin. This ultra-high-purity mixed bed resin is recommended for semiconductor plant final polishing loop applications. SAT10L is remarkable for its extremely low content of ionic contaminants in the resin phase. The method of preparation provides TOC leakage in the ppb range.

Diaion SKT20L is an improved version of Diaion SKT10L since it has been prepared with low levels of metals in the resin phase (500 ppb). This improvement allows ppt metals leakage in the product water quality (actual performance is <0.1 ppt for 13 metals within 4 hrs of rinse). Diaion SAT20L is an improved version of Diaion SAT10L since it has been prepared with low levels of metals in the resin phase (500 ppb). This improvement allows ppt metals leakage in the product water quality (actual performance is <0.1 ppt for 13 metals within 4 hrs of rinse).

Grade	Diaion SKT10L	Diaion SAT10L	Diaion SKT20L	Diaion SAT20L
Matrix Type	Gel --Styrene/DVB --			
Conversion (eq%)	>99.9 H form	>90.0 OH form	>99.9 H form	>90.0 OH form
Total Capacity (meq/ml-R)	>1.7	>0.9	>1.7	>0.9
Moisture Content (%)	50-60	62-72	50-60	62-72
Effective Size	0.45 min			
Particle Size Distribution	On 1180 um: 5% max Through 300 um: 1% max			
Uniformity Coefficient	1.6 max			
Resistivity (MΩ.cm)	>12 (3hrs)	>15 (3hrs)	>16 (12 hrs)	>18.1 (12 hrs)
TOC (ppb)	<20 (3hrs)	<20 (3hrs)	<5 (12hrs)	<1.0 (12hrs)
Metal Content (ppb/dry resin)			Na, Ca, Fe, Zn <1000	Na, Ca, Fe, Zn <1000

* Single Bed with inlet water quality of 15m Ω • cm resistivity at Flow Rate: SV30

Water & Food Processing Resins

The Relite and Indion brand resins were added to support the growing commodity water and food processing business as well as other Specialty applications.
The table below shows our strong cation exchangers that are offered to this industry.
Relite JC600, Indion 220 and Indion 525, have excellent properties for industrial application and are suitable for industrial scale softening and demineralization applications and other various uses such as catalyst, sugar processing, amino acid purification etc…, Indion 730H is a porous type resins that is suitable for water treatment, sugar processing, and other special chemical process applications. Indion 236 is a acrylic gel weak acid cation for high capacity operation for hardness removal in the presence of bicarbonate alkalinity.

Grade	Relite JC600	Indion 525	Indion 220	Indion 730H	Indion 236
Matrix Type	Gel (styrene/DVB), SO_3^-			Porous (styrene/DVB) SO_3^-	Gel, Acrylic weak acid cation
Counter Ion	Na	Na	Na	H	H
Total Capacity (meq/ml-R)	>2.0 Na Form	>2.15 Na Form	>1.9 Na Form	>1.7 H Form	>4.0
Moisture Content (%)	43-50	38-44	46-51	54-57	46-54
Shipping Density (grams/L)	830	840	820	740	740
Particle Size Distribution	On 1180 um: 5% max Through 300 um: 1% max				
Uniformity Coefficient	1.7 max	1.7 max	1.7 max	1.7 max	1.7 max
Whole Bead Count	90% min	90% min	90% min	90% min	90% min
Operating Temperature °C	120	120	120	120	120
Crosslinkage %	8	10	6	8	

The table below shows our strong anion exchangers that are offered to these industries.
JA100 is a gel type I strongly basic anion resin while Indion GS400 is a gel type II strongly basic anion resin used in water treatment operation. JA400 is a porous type I strongly basic anion resin mainly for organic removal, water treatment, sugar processing, and other special chemical process applications. Relite JA420 is a porous Type II strong base anion used in mixed bed applications in the sweetener industry as well as standard water treatment applications where high operating capacities are needed or organics are present.

Grade	Relite JA100	Relite JA400	Indion GS400	Relite JA420
Matrix Type	Gel, Styrene/DVB, Type I Strong Base Anion	Macroporous, Styrene/DVB, Type I Strong Base Anion	Gel, Styrene/DVB, Type II Strong Base Anion	Macroporous, Styrene/DVB, Type II Strong Base Anion
Counter Ion	Cl			
Total Capacity (meq/ml-R)	>1.2	>0.95	>0.90	>1.0
Moisture Content (%)	48-58	57-66	45-55	54-61
Particle Size Distribution	On 1180 um: 5% max Through 300 um: 1% max			
Uniformity Coefficient	1.7 max			
Whole Bead Count	90% min			
Operating Temperature (OH/ Cl)	60°C / 80°C			40°C / 60°C
Shipping Density (gram/L)	660	650	670	670

Water & Food Treatment Resins

Relite JA450 is a porous type I strongly basic anion resin which is suitable for removing nitrate ions from water for potable use. Relite JA800 and JA830 are a high capacity, organic fouling resistant, gel, acrylic type I strongly basic anion resin used in all types of deionization systems and chemical process applications. Relite JS020 is an aminophosphonic chelating resin. JS020 is used in applications such as decalcification of secondary brine in the chloroalkali industry.

Grade	Relite JA450	Relite JA830	Relite JA800
Matrix Type	Gel, Styrene/DVB, Type I, Nitrate Selective Anion (Triethyl ammonium)	Gel, Acrylic Type I strong base anion	Macroporous, Acrylic/DVB Type I strong base anion
Counter Ion	Cl	Cl	Cl
Total Capacity (meq/ml-R)	>0.9	>1.2 Cl form	>0.8
Moisture Content (%)	45-55	55-65	65-72
Shipping Density (grams/L)	670	680	700
Particle Size Distribution	On 1180 um:5% max Through 300um: 1% max		
Uniformity Coefficient	1.7 max		
Whole Bead Count	90% min		
Operating Temperature °C	60°C / 80°C	40°C	40°C / 60°C

Relite JA300, Indion 730H and Relite JA420 are our standard grade products for the corn sweetener industry. JA300 is a high operating capacity, porous weak base anion with good fouling resistance. The Indion 730H is a porous strong acid cation supplied in the H form. The JA420 is a low crosslinked Type II porous strong base anion for mixed bed operation. The low crosslinkage provides high level of color removal and long life due to its ability to regenerate efficiently.

Grade	Relite JA300	Indion 730H	Relite JA420
Matrix Type	Macroporous, Styrene/DVB, Weak Base Anion	Porous, (styrene/DVB), SO_3^- H^+	Macroporous, Styrene/DVB, Type II Strong Base Anion
Counter Ion	free base	H	Cl
Total Capacity (meq/ml-R)	>1.5	>1.7 H Form	>1.0
Moisture Content (%)	47-55	54-57	54-61
Shipping Density (grams/L)	640	740	670
Particle Size Distribution	On 1180 um: 5% max Through 300 um: 1% max		
Uniformity Coefficient	1.7 max		
Whole Bead Count	95% min	90% min	95% min
Operating Temperature °C	80	120	40(OH), 60 (Cl)
Crosslinkage %		8	

Fractionation Resins for Industrial Chromatography

Chromatographic separation is widely industrialized in pharmaceuticals, fermentation, and food applications. The smaller particles with a uniform particle size distribution, obtain higher yields and purities. These types of resins are suitable for industrial chromatography such as fructose/glucose separation…
Diaion UBK resin are prepared via monodispersed production technology, and offered with narrow particle size distributions in sodium, potassium or calcium form. The high bead uniformity provides fractionation resins with excellent resolving power and mechanical stability. These products are often applied in simulated moving beds (SMB) equipment with 4 to 8 column design for separation of binary and ternary mixtures in both small and large scale industrial applications.

The UMA series are strong base anion exchange resins, gel type, based on styrene-DVB polymer matrix, manufactured with Mitsubishi Chemical most up-to-date technology. These resins are used in special application such as the biomass industry for salt retardation. Due to their high uniformity, the UMA series offer excellent fractionation and great osmotic stability.

Grade	Diaion UBK530	Diaion UBK532	Diaion UBK535	Diaion UBK522M	Diaion UBK522K
Matrix Type	Gel (styrene/DVB), SO_3^-				
Counter Ion	Na	K	Ca	K	K
Total Capacity (meq/ml-R)	>1.6	>1.6	>1.6	>1.6	>1.6
Moisture Content (%)	52-56	46-51	48-52	47-52 (K form) 61-63 (H form)	47-52 (K form) 59-64 (H form)
Shipping Density (grams/L)	830	820	840	810	830
Particle Sizes Available (um)	UBK530 = 220 UBK530J = 280 UBK530L = 320 UBK530K = 350	UBK532 = 220 UBK532J = 280 UBK532L = 320 UBK532K = 350	UBK535 = 220 UBK535J = 280 UBK535M = 310 UBK535L = 320 UBK535K = 350	310	350
Uniformity Coefficient	1.10	1.10	1.10	1.10	1.10
Whole Bead Count	95% min				
Operating Temperature	120°C max				
Crosslinkage %	6	6	6	5	5

Grade	Diaion UBK510L	Diaion UBK550	Diaion UBK555
Matrix Type	Gel (styrene/DVB), SO_3^-		
Counter Ion	Na	Na	Ca
Total Capacity (meq/ml-R)	>1.3	>1.9	>2.0
Moisture Content (%)	61-65	46-50	42-46
Shipping Density (grams/L)	790	850	870
Particle Sizes Available (um)	320	220	220
Uniformity Coefficient	1.10	1.10	1.10
Whole Bead Count	90% min		
Operating Temperature	120°C max		
Crosslinkage %	4	8	8

Grade	Diaion UMA150	Diaion UMA230L
Matrix Type	Gel (styrene/DVB) Type I $R\text{-}CH_2\text{-}N(CH_3)_3^+$	Gel (styrene/DVB) Type II $R\text{-}CH_2\text{-}N(CH_3)_2(CH_3CH_2OH)^+$
Counter Ion	Cl	Cl
Total Capacity (meq/ml-R)	>1.4	>1.4
Moisture Content (%)	37-47	37-47
Shipping Density (grams/L)	720	730
Particle Size Distribution (um)	220-260	310-330
Uniformity Coefficient	1.1 max	1.1 max
Whole Bead Count	95% min	
Operating Temperature	60°C (OH) 80°C (Cl)	40°C (OH) 60°C (Cl)
Swelling Ratio (%)	23	15

Preparative Ion Exchange Resins

The CK grade resins are based on a crosslinked polystyrene matrix having sulfonic acid groups with a sodium counter-ion for easy substitution. By varying the crosslinking degree or the DVB content (divinyl-benzene ratio) and the bead size of these resins, one can control the efficiency and the resolution in the separation of amino-acids, carbohydrates, sugars, organic acids and amines etc… These styrenic matrices have excellent mechanical strength with wide range pH stability (1 to 14) and resistance to high temperatures (up to 120 °C operating temperature).

Grade	MCI GEL CK02A	MCI GEL CK08Y	MCI GEL CK08P	MCI GEL CK10Y
Matrix Type	Gel (styrene/DVB), SO_3^-			
Counter Ion	Na	Na	H	Na
Total Capacity (meq/ml-R)	>0.5	>1.9	>1.9	>2.0
Moisture Content (%)	52-56	46-51	48-52	47-52 (K form) 61-63 (H form)
Shipping Density (grams/L)	830	820	840	810
Particle Sizes Range (um)	16 - 24	20 - 30	75 - 150	20 - 30
Mean Particle Size (um)	20	25	110	25
Packing Size	10 grams	50, 300 grams	100 ml	50 grams
Typical Usage	Oligosaccharide	Sugar, Carboxylic Acids	Sugar, Carboxylic Acids	Amino Acids
Crosslinkage %	2	8	8	10

The CA grade resins are based on a crosslinked polystyrene matrix having quaternary amine groups (trimethyl amine) with a chloride counter-ion for easy substitution. By varying the crosslinking degree or the DVB content (divinyl-benzene ratio) and the bead size of these resins, one can control the efficiency and the resolution in the separation of nucleotides, carbohydrates, sugars, carboxylic acids and anionic substances (e.g. Humic) etc… These styrenic matrices have excellent mechanical strength with wide range pH stability (1 to 14) and resistance to high temperatures (up to 60 °C operating temperature).

Grade	MCI GEL CA08Y	MCI GEL CA08P
Matrix Type	Gel (styrene/DVB) Type I $R\text{-}CH_2\text{-}N(CH_3)_3^+$	Gel (styrene/DVB) Type I $R\text{-}CH_2\text{-}N(CH_3)_3^+$
Counter Ion	Cl	Cl
Total Capacity (meq/ml-R)	>1.2	>1.3
Moisture Content (%)	37-47	37-47
Particle Size Range (um)	20 - 30	75 - 150
Mean Particle Size (um)	25	110
Whole Bead Count	95% min	
Packing Size	50 gram	100 ml
Crosslinkage %	8	8

Strongly Acidic Catalyst Resins

These are the hydrogen form of our strongly acidic cation resins which are used in catalysis. There are SK-grade of gel type, PK-grade of porous type, and RCP of highly porous type. The standard shipping form is hydrogen form as such counter ion is needed to run an effective solid phase acid catalysis.

The gel type SK catalysts can be used in aqueous reactions and where the hydrophilicity of the reaction medium is high such as esterification of methacrylic acid, ester hydrolysis, and esterification of acetic acids with methanol. Some special modifications of these resins are offered for high selectivity BPA formation.

The PK resin grades are based on a porous styrene DVB polymer matrix. Their porous structure provides excellent durability against osmotic shock by swelling and shrinkage. They can be used in similar applications as the SK type in hydrophilic mediums but their porosity allow them to also work in non-aqueous mediums for esterification of acetic acids with longer chain alcohols

Diaion RCP160M is based on a macroporous crosslinked polystyrene matrix with sulfonic acid functional groups. These matrices are more open and porous than conventional grade resin with increased polymer surface available for intimate contact with solutes. In catalysis, the reaction rates are faster with RCP160M than standard grade resins, resulting in a higher degree of conversion during catalytic applications. It is also the preferred resin in non-aqueous reactions such as the hydration of olefins and alkylation of phenols.

Grade	Diaion SK104H	Diaion SK1BH	Diaion PK208LH	Diaion PK216LH	Diaion PK228LH
Matrix Type	Gel (styrene/DVB), $SO_3^- H^+$		Porous (styrene/DVB), $SO_3^- H^+$		
Counter Ion	H				
Total Capacity (meq/ml-R) H Form	>1.1	>1.7	>1.1	>1.6	>1.9
Moisture Content (%) H Form	62-72	50-60	63-73	50-60	39-49
Shipping Density (grams/L) H Form	750	790	740	760	770
Particle Size Distribution	On 1180 um: 5% max Through 300 um: 1% max				
Effective Size	0.40 min				
Uniformity Coefficient	1.6 max				
Whole Bead Count	90% min		95% min		
Operating Temperature	120°C max				
Crosslinkage %	4	8	4	8	14

Grade	Daion RCP160M	Diaion RCP145H
Matrix Type	Highly Porous (styrene/DVB), $SO_3^- H^+$	
Counter Ion	H	H
Total Capacity (meq/ml-R) H Form	>1.5	>0.8
Moisture Content (%) H Form	45-55	61-71
Shipping Density (grams/L) H Form	740	740
Particle Size Distribution	On 710um: 25% Thru 250um: 1%	On 1180um: 5% Thru 300um: 1%
Effective Size	0.40 min	
Uniformity Coefficient	1.6 max	
Whole Bead Count	95% min	
Operating Temperature	120°C max	150°C max

Synthetic Adsorbents

Diaion HP20 synthetic adsorbent resin is a macroporous styrenic polymeric bead type resin designed for adsorption/desorption process scale applications. Its matrix provides an aromatic non-polar surface with excellent selectivity for hydrophobic areas of molecules, including biomolecules like antibiotics via low energy van der Waal's interactions. It is remarkable for its wide pore polymeric structure which provides excellent broad spectrum adsorption characteristics. Diaion HP21 has slightly smaller pores, and slightly higher surface area than Diaion HP20.

The Sepabeads SP825 and SP850 resins provide a smaller more uniform pore size distribution and higher surface area as compared to Diaion HP20. The increase in surface area is approximately 2x traditional adsorbents and nearly matches the surface area of activated carbon. In many applications, this means twice the working capacity for the same volume of resin. These adsorbents are recommended for industrial chemical process applications, bio/pharmaceutical applications such as desalting and extraction, and waste treatment… Sepabeads SP70 and SP700 are premium grade resins designed for the debittering of juices and related food products. These high surface area resins offer excellent kinetics and high capacity for naringin (and other bittering agents). They meet the compositional requirements for Secondary Direct Food Additives (21 CFR Section 173.65).

The Sepabeads SP207 resin is a macroporous chemically modified brominated styrenic polymeric type resin. The bromination of the aromatic ring provides increased hydrophobicity, and consequently, increased selectivity for hydrophobic molecules versus conventional styrene/DVB synthetic adsorbents like Diaion HP20 resin. In addition, the bromination increases the resin density which allows for settling in fermentation broths, and for usage in upflow fluidized beds.

Diaion HP2MGL is a macroporous methacrylate polymeric resin. It has no aromatic character. Diaion HP2MGL grades have different selectivity than the classic Diaion HP20. It is recommended for broad spectrum adsorption and desorption of small and large molecules, long chain aliphatic molecules, decolorization and desalting applications, and should be evaluated as an alternate resin matrix to the styrenic based adsorbents.

Grade	Diaion HP20	Diaion HP21	Sepabeads SP825L	Sepabeads SP850	Sepabeads SP700	Diaion HP50
Matrix Type	Highly Porous, Styrene / DVB					
Ceph C Capacity (g/l)	38	40	80	85	85	
Moisture Content (%)	55-65	50-60	52-62	46-52	60-70	45-55
Shipping Density (grams/L)	690	680	690	690	690	670
Particle Size Distribution	On 250 um: >90%					
Surface Area (m^2/dry gram)	590	640	930	930	1100	450
Pore Volume (ml/gram)	1.3	1.3	1.4	1.1	2.20	0.9
Average Pore Radius (A^o)	290	110	70	45	90	750
Swelling (water to toluene) %	25	40	12	15	5	27
Max. Operating Temperature ^oC	130 ^oC					

Grade	Sepabeads SP70	Sepabeads SP207	Diaion HP2MGL
Matrix Type	Highly Porous, Styrene / DVB	Brominated Styrene/DVB	methacrylate
Ceph C Capacity (g/l)		120	<10
Moisture Content (%)	57-67	43-53	55-65
Shipping Density (grams/L)	690	790	720
Particle Size Distribution	On 250 um: >90%		<1% thru 355um
Surface Area (m^2/dry gram)	700	600	570
Pore Volume (ml/gram)	1.5	1.0	1.3
Average Pore Radius (A^o)	70	110	240
Swelling (water to toluene) %	20	13	7
Max. Operating Temperature ^oC	130 ^oC		

Synthetic Adsorbents for Chromatography Separation

It is well known that smaller size resins are required to obtain higher purity and better recovery in chromatographic separation of pharmaceuticals. Mitsubishi Chemical offers several types of synthetic adsorbent grades, with specific particle size distribution, for industrial scale chromatography.

HP20SS and SP20SS are directly polymerized, small particle size versions of HP20. The wide pore polymer matrix provides excellent kinetics and capacity for small biomolecules of both preparative and process scale. They offer nice balance of pressure flow characteristics and true chromatographic fractionation and have also been successfully applied in simulated moving bed (SMB) applications for a variety of small biomolecules. They often compete with bonded silica supports for preparative and industrial applications.

SP2MGS is a small and uniform particle size version of the methacrylate Diaion HP2MG. The SP2MGS offers higher dynamic capacity versus the HP2MG and shows strong retention and unique selectivity in normal phase chromatography.

SP207SS is a small size version of the Sepabeads SP207. It is applied to reversed phase chromatography. The brominated polymeric matrix provides unique selectivity, full pH operating range and long operating life versus the conventional bonded silica packing materials used in preparative and industrial applications.

Grade	**Diaion HP20SS**	**Sepabeads SP20SS**	**Sepabeads SP207SS**
Matrix Type	Highly Porous, Styrene / DVB	Highly Porous, Styrene / DVB	Brominated Styrene/DVB
Moisture Content (%)	55-67	55-65	43-53
Shipping Density (grams/L)	670	660	780
Particle Size Distribution	>150um: 15% max 63-150um: 70% min <63um: 20% max	>75um: 30% max 63-75um: 55% min <63um: 15% max	>150um: 15% max 63-150um: 70% min <63um: 20% max
Surface Area (m^2/dry gram)	560	560	590
Pore Volume (ml/gram)	1.2	1.2	1.0
Average Pore Radius (A^o)	290	290	110
Max. Operating Temperature ^oC	130 ^oC		

Styrenic Reversed Phase Resins

The CHP grade resins are based on highly crosslinked polystyrene matrix with no functionality. By varying the pore size, the surface area, and the bead size of these resins, the chromatographer can control the efficiency and the resolution in the separation of pharmaceuticals (e.g. heterocyclic compounds), steroids, small peptides and proteins, oligonucleotides, amphoteric molecules (e.g. sulfonamides, antibiotics, nucleic bases), basic drugs (e.g. anticonvulsants), simple amines (e.g. catecholamine), and antihistamines etc… These styrenic matrices have excellent mechanical strength with wide range pH stability (1 to 14) and resistance to high temperatures (up to 120 °C operating temperature).

CHP20 grades are the preparative size for HP20. CHP50 grades are the preparative size for HP21. CHP07 grades are the preparative size for SP207.

CSP800 is used for enrichment traces of organic compounds in environmental water with high concentration ratio and high recovery, is recommended for sample preparation for mutagenicity study. CHP85/P120 and CHP87/P120 with controlled micro-pore size, in particular, have a distinctive advantage not to adsorb high molecular weight proteins but to adsorb only low molecular weight organic compounds.

Grade	MCI GEL CHP20/P20	MCI GEL CHP20/P30	MCI GEL CHP20/P70	MCI GEL CSP 800	MCI GEL CHP85/P120	MCI GEL CHP87/P120
Matrix Type	Highly Porous, Styrene / DVB					
Mean Size (um)	20	30	120	120	120	120
Particle Size Range (um)	18-22	20-40	75-120	75-120	75-120	75-120
Average Pore Diameter (A^o)	450	450	450		small	very small

Grade	MCI GEL CHP50/P10	MCI GEL CHP50/P20	MCI GEL CHP50/P30	MCI GEL CHP07/P120
Matrix Type	Highly Porous, Styrene / DVB			Brominated, Styrene/DVB
Mean Size (um)	10	20	30	120
Particle Size Range (um)	9-11	18-22	20-40	75-150
Average Pore Diameter (A^o)	250	250	250	250

Note: a) Most of the above products are available in bead sizes > 200 µm for large industrial applications. Please check the Synthetic Adsorbent section.
b) The above products are available in uniform bead sizes < 10 µm which are available in bulk or HPLC columns for small analytical applications. Please request our MCI GEL catalog of these analytical resins.

Methacrylic Reversed Phase Resins

The CMG grade resins are based on highly crosslinked polymeth acrylic matrix with no functionality. Polymethacrylate resins have no aromatic character, offering medium hydrophobicity (less hydrophobic than styrenic resins or octadecyl silane). They are mainly used in the separation of pharmaceuticals (e.g. polyaromatic and polyaliphatic compounds), water soluble vitamins, small peptides and proteins, oligonucleotides, simple amines (e.g. catecholamine), and agricultural chemicals etc… These methacrylic matrices have excellent mechanical strength and wide range pH stability (1 to 13), and resistance to high temperatures (up to 120 °C operating temperature). CMG grades are the preparative size of HP2MGL.

The CHPOD is an unusual product as it has surface hydrophobicity as well as hydrophobic functionality. It is an Octoadecyl-alkylated aliphatic porous polymer which is less hydrophobic than the other CHP resin but more hydrophobic than the CMG grades.

Grade	MCI GEL CMG20/P10	MCI GEL CMG20/P30	MCI GEL CHPOD/P30
Matrix Type	Methacrylate		Octadecyl-Alkylated Aliphatic
Mean Size (um)	10	30	30
Particle Size Range (um)	9-11	25-35	25-35
Average Pore Diameter (A^{o})	250	250	250

Note: a) Most of the above products are available in bead sizes > 200 µm for large industrial applications. Please check the Synthetic Adsorbent section.
b) The above products are available in uniform bead sizes < 10 µm which are available in bulk or HPLC columns for small analytical applications. Please request our MCI GEL catalog of these analytical resins.

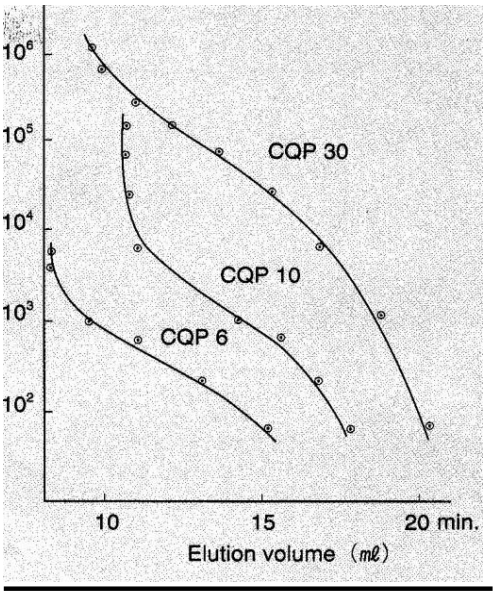
Bioseparation: Hydrophilic Aqueous Gel Filtration Resins

The CQ grade resins are based on highly crosslinked polymethacrylic matrix, which is further hydroxylated for added hydrophilicity. These matrices are not functionalized, and have no interfering ionic interaction to achieve maximum separation by size exclusion. By varying the bead size and pore size of these resins, the chromatographer can control the efficiency and the resolution in the separation of proteins, peptides, lipids, and polynucleotides. These methacrylic matrices have excellent mechanical strength with wide range pH stability (1 to 13) and resistance to high temperatures (these resins can be autoclaved at 121°C for 20 minutes). The calibration curve for MCI GEL CQP grades is presented below.

Grade	MCI GEL CQP06	MCI GEL CQP10	MCI GEL CQP30	MCI GEL CQP30P	Sepabeads FP-HG13
Matrix Type	polymethacrylate				
Mean Particle Size (um)	10	10	10	30	120
Particle Size Range (um)	9-11	9-11	9-11	25-35	100-150
Functional Group	Diol	Diol	Diol	Diol	Diol
Counter Ion	none	none	none	none	none
Exclusion Limit	Up to 1,000	Up to 10,000	Up to 10^6	Up to 10^6	Up to 10^6
Pore Diameter (A^o)	120	200	200	600	600
Column Dimension	7.5 x 75mm			none	none
Standard Packing Size	10, 25, 50 g			100 ml	

*Larger packing sizes are available as custom packing

Molecular Weight



Conditions

Column : MCI GEL CQP06, CQP10, CQP30
4.5mm IDx600mmL
Eluent: H_2O
Flow Rate: 1.0 ml/min
Column temp: ambient
Detection: RI
Sample: PEG 100µl injection

Remarks in handling Ion Exchange Resins

Handling:
Wear suitable personal protective equipment to prevent exposure to eyes and skin, and handle ion exchange resins at well-ventilated places from the windward. Eye-washing facilities should be set nearby. When contacted with eyes, rinse eyes with much water and consult a doctor. When swallowed, drink a lot of water and consult a doctor depending on symptoms. Spilt ion exchange resins should be collected and the floors should be cleaned, lest they may be slippery. Separate from high temperature machinery and materials, fireworks, flames, and avoid contacts and/or mixing with oxidizing materials
Sufficient care must be taken not to contact with oxidizing agents, e.g. nitric acid, since ion exchange resins may degrade or even explode when contacted with them.

Storage:
Store in cool, dry, well-ventilated, and dark place. Close tightly to prevent contamination and solvent vaporization. Separate from oxidizing materials.
Ion exchange resins deteriorate fast at high temperatures and containing water may freeze and break the beads at temperatures below freezing.

Disposal:
Disposal of unused ion exchange resins should be done by reclamation and/or incineration according to the instructions at the notice of handling and storage. Incineration should be implemented by incinerators that have proper facilities to treat Sox, NOx, CO, and other gases. The used ion exchange resins that adsorb heavy metals must be disposed subject to the direction of the wastes disposal and public clean laws.

Preparation before use:
After filling brand new ion exchange resins into towers, backwashing and conditionings are recommended in order to eliminate the remaining elution impurities.
The backwashing and conditioning conditions vary depending on the designs and the reagents that can be applied.
There are two ways in conditioning: one is reciprocal washings with dilute acid water, e.g.2N-HCl, and with dilute alkali water, e.g. 1N-NaOH, and the other is reciprocal flows of regenerating reagents and rinse water. The conditioning method and the number of such repetition are decided on the required quality of the treated water and other factors.
Consult the designer/engineer of your packed columns before the actual operations.

CONTACT INFORMATION

Please do not hesitate to contact us when in need of samples, pricing, SDS as well as technical information and guidance.

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