

# Purolite™ Resins Product Guide

Inside you will find a broad overview of the characteristics and applications of Purolite Resin products. This guide is divided by product type, industry, application or brand.

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# Purolite Resins Product Guide



## THIS IS AN INTERACTIVE DOCUMENT

Clicking on any word/product name in blue will take you to that respective area on the Purolite Resins website. Clicking on the section in the table of contents will take you to that page.

## Section Name

Product	Type	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Specific Gravity	Reversible Swelling (max. %)	Remarks & Applications
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# Strong Acid Cation (SAC) Exchangers

Strong Acid Cation resins are used for domestic and industrial softening (in Na<sup>+</sup> form) and demineralization (in H<sup>+</sup> form). All of them are based on a polystyrenic matrix which bears sulfonic functional groups.

Gel type resins have a homogeneous structure, with only micropores inside the beads: they have fast kinetics and a high operating capacity and they are the products of choice for most conventional applications.

Macroporous resins have pore structures significantly more robust than gel resins that allow macroporous resins to be used in more challenging applications and in harsher operating conditions. Macroporous resins are in fact more osmotically and oxidatively stable and less prone to mechanical breakdown.

Like most Purolite Resin products, our strong acid cation ion exchange resins are available in several ionic forms and in many size gradings including uniform particle size. They are available with many types of regulatory approvals such as NSF Certified, Kosher and Halal.

Product	Type	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Specific Gravity	Reversible Swelling (max. %)	Remarks & Applications
<b>C100E</b>	Gel Polystyrenic	Na <sup>+</sup>	1.9	46–50	1.27	Ca <sup>2+</sup> →Na <sup>+</sup> 8 Na <sup>+</sup> →H <sup>+</sup> 10	Softening and demineralization resin, widely used in industrial and domestic applications. Potable water grade.
<b>C100</b>	Gel Polystyrenic	Na <sup>+</sup>	2.0	44–48	1.29	Na <sup>+</sup> →H <sup>+</sup> 9	Primary softening and demineralization resin for industrial and potable water applications.
<b>C100X10</b>	Gel Polystyrenic	Na <sup>+</sup>	2.2	40–43	1.30	Na <sup>+</sup> →H <sup>+</sup> 8	High resistance to oxidation. Higher density cation resin offering good separation from anion resins in mixed bed applications and weak acid cation resins in layered beds.
<b>SUPERGEL™ SGC650</b>	Gel Polystyrenic	Na <sup>+</sup>	2.2	40–43	1.30	Na <sup>+</sup> →H <sup>+</sup> 10	Uniform particle size used for condensate polishing and make-up MB's. Offers excellent physical strength and high resistance to OSA. Operating in conjunction with Supergel SGA550.
<b>C150</b>	Macroporous Polystyrenic	Na <sup>+</sup>	1.8	48–53	1.25	Na <sup>+</sup> →H <sup>+</sup> 7	Macroporous structure offers high resistance to OSA. Employed in challenging operating conditions such as condensate treatment and process applications.
<b>C160</b>	Macroporous Polystyrenic	Na <sup>+</sup>	2.3	35–40	1.30	Na <sup>+</sup> →H <sup>+</sup> 4	Higher cross linked macroporous resin with higher exchange capacity offering excellent resistance to oxidation. For process applications, and in the treatment of industrial waste streams.

NOTE: Above products also available in the H<sup>+</sup> form.

# Weak Acid Cation (WAC) Exchangers

Weak Acid Cation (WAC) ion exchange resins are primarily used for water dealkalization and softening, but also can be applied for the removal of heavy metals in potable, process and wastewater treatment. They are also used in drinking water cartridges, pharmaceutical and biotech applications.

All weak acid cation resin products have a polyacrylic backbone. The functional carboxylic groups give high chemical efficiency, with very low regenerant demand.

They are typically supplied in H<sup>+</sup> form, but they are also available with partial conversion in Na<sup>+</sup>/Mg<sup>2+</sup>/Ca<sup>2+</sup> form.

Product	Type	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Specific Gravity	Reversible Swelling (max. %)	Remarks & Applications
<b>C104Plus</b>	Porous Polyacrylic	H <sup>+</sup>	4.7	45–55	1.19	H <sup>+</sup> →Ca <sup>2+</sup> 20 H <sup>+</sup> →Na <sup>+</sup> 60	High capacity regenerable dealkalization resin with good exchange kinetics. Also available in food grade as C104EPlus.
<b>C107E</b>	Porous Polyacrylic	H <sup>+</sup>	3.6	53–58	1.17	H <sup>+</sup> →Ca <sup>2+</sup> 25 H <sup>+</sup> →Na <sup>+</sup> 90	Specifically designed dealkalization resin for use in small cartridges for domestic applications. Not usually regenerated.
<b>C1030</b>	Porous Polyacrylic	H <sup>+</sup>	4.0	50–60	1.14	H <sup>+</sup> →Na <sup>+</sup> 80	Regenerable dealkalization resin with good capacity and exchange kinetics for wastewater and organic solutions. Very high resistance to oxidation and osmotic shock.
<b>C115E</b>	Porous Polymethacrylic	H <sup>+</sup>	3.5	46–53	1.10	H <sup>+</sup> →Ca <sup>2+</sup> 40 H <sup>+</sup> →Na <sup>+</sup> 100	Very weakly acidic for process applications especially in the pharmaceutical industry. Recommended for the Carix™ (Veolia Water Technologies) process.

NOTE: Resins with partial conversion in Na<sup>+</sup>/Mg<sup>2+</sup>/Ca<sup>2+</sup> form are available for cartridge applications.



Ecolab's weak acid cation exchangers do a great job of partially demineralizing water while removing harmful metals and other cationic impurities.

## Particle Size Distribution – Cation Exchangers

Product Grade	Nominal Particle Size (µm)	Max % Below Lower Limit	Uniformity Coefficient*	Remarks & Applications
STD	300–1200	1% < 300	≤ 1.7	Standard grade.
MB	425–1200	2% < 425	≤ 1.6	Mixed bed grade.
TL	710–1200	1% < 710	≤ 1.3	Mixed bed grade which can be used with intermediate inert spacer in 3-component mixed bed systems (Trilite™).
DL STRONG	630–1200	5% < 630	≤ 1.4	Layered beds, lower layer.
DL WEAK	300–850	2% < 300	≤ 1.4	Layered beds, upper layer.
S	425–1200	2% < 425	≤ 1.6	Special food grade applications (treatment of sugar solutions, etc.).
C	425–1200	2% < 425	≤ 1.6	High specific flow rate industrial water treatment.
G	500–1200	2% < 500	≤ 1.5	Very high specific flowrate softening applications, such as dishwashers.

Product Grade	Mean Diameter (µm)	Uniformity Coefficient*	Remarks & Applications
PUROFINE™	570 ± 50	1.1–1.2	High-efficiency softening and demineralization. Excellent kinetics and rinse properties.
PUROPACK™ GEL	650 ± 50	1.1–1.2	High-efficiency grade particularly suited to counter-flow regenerated packed bed systems.
PUROPACK MACROPOROUS AND ACRYLICS	700 +/- 100** or 750 +/- 100**	1.2–1.4	High-efficiency grade particularly suited to counter-flow regenerated packed bed systems.

NOTE: Most resins presented in this catalog can be supplied as Purofine™ and Puropack™ grades (specific literature available).

Mean diameters can vary for different ionic forms. Please see individual product data sheets.

WAC grading specs for STD, C and S grades have been widened to 1400–1600 µm on the coarse end.

\* Is a measure of the uniformity of the particle size distribution. Uniformity coefficient ranges between 1.0–1.7. The closer to 1.0, the more uniform the beads.

\*\* Please refer to the individual product data sheets for details.



Ecolab cation resins are widely used for water demineralization, in conventional plants as well as in Puropack packed bed systems.

# Strong Base Anion (SBA) Exchangers

Ecolab offers an extensive range of Strong Base Anion (SBA) ion exchange resins based on a polystyrenic or polyacrylic matrix with either gel and macroporous structures. These products include Type I and Type II, as well as mixed base and ion selective functionality. They are supplied in a wide range of grades and ionic forms to optimize performance.

Type I resins have higher silica removal efficiency and are thermally more stable, while Type II have a higher operating capacity. Polystyrenic resins are more rigid and more hydrophobic compared to polyacrylic based resins. Typically, they also have higher thermal stability. These factors should be considered when choosing the proper strong base anion resin since they can affect performance in some applications.

In many cases, Ecolab produces equivalent strong base anion products in both gel and macroporous structures. Generally, gel resins have a higher breaking weight and offer higher activity levels (working capacity). Due to their pores, macroporous resins have better resistance to osmotic shock attrition, better access to the active sites and greater resistance to fouling due to the large surface area.

Product	Type	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Specific Gravity	Reversible Swelling (max. %)	Remarks & Applications
<b>A400</b>	Type I Gel Polystyrenic	Cl <sup>-</sup>	1.3	48–54	1.08	Cl <sup>-</sup> →OH <sup>-</sup> 30	Used primarily in industrial water treatment in warmer climates due to its higher temperature stability. Offers the best silica removal even in co-flow regenerated plants. Also widely used in mixed beds as A400MB, Purofine PFA400MB.
<b>A444</b>	Type I Gel Polystyrenic	Cl <sup>-</sup>	1.0	50–60	1.07	Cl <sup>-</sup> →OH <sup>-</sup> 30	Alternative high moisture gel anion resin for demineralization. Offers increased resistance to organics.
<b>SUPERGEL SGA550</b>	Type I Gel Polystyrenic	Cl <sup>-</sup>	1.4	43–48	1.09	Cl <sup>-</sup> →OH <sup>-</sup> 24	Uniform particle size Supergel resin with higher resistance to mechanical and osmotic shock. Recommended for condensate polishing and make-up mixed beds, operating in conjunction with Supergel SGC650.
<b>A500Plus</b>	Type I Macroporous Polystyrenic	Cl <sup>-</sup>	1.1	54–65	1.08	Cl <sup>-</sup> →OH <sup>-</sup> 20	Macroporous version of A400 offering greater resistance to OSA. Mainly used in condensate polishing or make-up mixed beds, where its polymer structure helps in resisting organic fouling.

## Strong Base Anion Exchangers (Cont'd)

Product	Type	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Specific Gravity	Reversible Swelling (max. %)	Remarks & Applications
<b>A504P</b>	Type I Macroporous Polystyrenic	Cl <sup>-</sup>	1.2	50–60	1.07	Cl <sup>-</sup> →OH <sup>-</sup> 15	Orthoporous resin able to remove both colloidal and dissolved silica.
<b>A200</b>	Type II Gel Polystyrenic	Cl <sup>-</sup>	1.3	45–51	1.08	Cl <sup>-</sup> →OH <sup>-</sup> 20	High capacity resin offering good silica removal, primarily used in the production of demineralized and dealkalized water.
<b>A300</b>	Type II Gel Polystyrenic	Cl <sup>-</sup>	1.4	40–47	1.09	Cl <sup>-</sup> →OH <sup>-</sup> 20	Premium grade high capacity resin offering good silica removal. Primarily used in the production of demineralized and dealkalized water.
<b>A510Plus</b>	Type II Macroporous Polystyrenic	Cl <sup>-</sup>	1.1	50–60	1.08	Cl <sup>-</sup> →OH <sup>-</sup> 15	Macroporous version of A200 offering better resistance to OSA and organic fouling due to its polymer structure.
<b>A520</b>	Quaternary Ammonium Macroporous Polystyrenic	Cl <sup>-</sup>	0.9	48–55	1.07	—	Selective nitrate removal resin for wastewater applications.
<b>A532</b>	Complex Amino Gel Polystyrenic	Cl <sup>-</sup>	0.7	35–46	1.04	—	Ultra-high selectivity and capacity for perchlorate, pertechnetate and other oxyanions from wastewater.
<b>A850</b>	Gel Polyacrylic	Cl <sup>-</sup>	1.2	57–62	1.09	Cl <sup>-</sup> →OH <sup>-</sup> 20	Most widely used resin for the demineralization of high organic bearing waters, offering the best resistance to organic fouling. Higher operating capacity than Type I polystyrenic resins, while still offering very good silica leakage in co-flow and counter-flow regeneration.
<b>A870</b>	Gel Dual Functionality Polyacrylic	Cl <sup>-</sup> / Free Base	1.25 (Cl form)	56–62 (Cl form)	1.08	Cl <sup>-</sup> →OH <sup>-</sup> 10	Bifunctional resin combining weak and strong base sites on the same beads, offering the highest operating capacity and excellent resistance to organic fouling. Should not be used where the feed water contains a high weak acid anionic loading (CO <sub>2</sub> + SiO <sub>2</sub> ). Recommended weak acid loading less than 20%.

NOTE: Most of the above products are also available in the OH<sup>-</sup> form.  
SBA resins are temperature sensitive. This must be taken into consideration in selecting the correct product.  
Please consult your local Ecolab office.

# Weak Base Anion (WBA) Exchangers

Ecolab manufactures gel and macroporous weak base anion resins. Our weak base anion gel products have an acrylic backbone while our weak base anion macroporous products have either an acrylic or styrenic backbone.

Weak base anions are more chemically stable than strong base anions and are used for the removal of mineral acids, organic acids and other organic materials. They are highly resistant to organic fouling. The applications for weak base anion ion exchange resins are extensive – well beyond classic industrial water treatment. Tertiary amine/quaternary ammonium, pure tertiary amine, primary amine and polyamine functionalities are available.

Product	Type	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Specific Gravity	Reversible Swelling (max. %)	Remarks & Applications
<b>A100Plus</b>	Macroporous Polystyrenic	Free Base	1.3	53–62 (Cl <sup>-</sup> form)	1.04	Free Base → Cl <sup>-</sup> 22	Most widely used WBA in IWT due to its good resistance to organic fouling and high operating capacity.
<b>A103Plus</b>	Macroporous Polystyrenic	Free Base	1.5	51–58 (Cl <sup>-</sup> form)	1.04	Free Base → Cl <sup>-</sup> 25	S grade used in the food industry for demineralization and decolorization.
<b>A111</b>	Macroporous Polystyrenic	Free Base	1.7	56–62 (Cl <sup>-</sup> form)	1.02	Free Base → Cl <sup>-</sup> 48	High moisture, high capacity WBA resin without any quaternary ion exchange groups. Can offer significant advantages for high organic bearing waters and sweeteners solutions.
<b>A110</b>	Macroporous Polystyrenic	Free Base	2.0	58–66 (Cl <sup>-</sup> form)	1.05	Free Base → Cl <sup>-</sup> 50	Special WBA resin with primary amine groups. High capacity. Can be used for the adsorption of CO <sub>2</sub> .
<b>A848</b>	Gel Polyacrylic	Free Base	1.4	59–65	1.07	Free Base → Cl <sup>-</sup> 15	First choice acrylic WBA resin for IWT offering higher capacity than polystyrenic resins and good rinse characteristics. Good reversible removal of organics due to more hydrophilic acrylic polymer.
<b>A830</b>	Macroporous Polyacrylic	Free Base	2.75	50–56	1.10	Free Base → Cl <sup>-</sup> 20	Very high exchange capacity polyamine resin.

## Particle Size Distribution – Anion Exchangers

Product Grade	Nominal Particle Size (µm)	Max % Below Lower Limit	Uniformity Coefficient*	Remarks & Applications
STD	300–1200	1% < 300	≤ 1.7	Standard grade.
MB	300–1200	1% < 300	≤ 1.7	Mixed bed grade.
TL	425–850	1% < 425	≤ 1.35	Mixed bed grade which can be used with intermediate inert spacer in 3-component mixed bed systems (Trilite).
DL STRONG	630–1200	5% < 630	≤ 1.4	Layered beds, lower layer.
DL WEAK	300–630	3% < 300	≤ 1.4	Layered beds, upper layer.
S	425–1200	2% < 425	≤ 1.6	Special food grade applications (treatment of sugar solutions, etc.).
C	425–1200	2% < 425	≤ 1.6	High specific flow rate. Industrial water treatment.

Product Grade	Mean Diameter (µm)	Uniformity Coefficient*	Remarks & Applications
PUROFINE	570 ± 50	1.1–1.2	High efficiency grade with excellent kinetics and rinse properties. Also employed as mixed bed anion component with PPC grade cation resins.
PUROPACK GEL	650 ± 50	1.1–1.2	High efficiency grade particularly suited to counter-flow regenerated packed bed systems.
PUROPACK MACROPOROUS AND ACRYLICS	750 ± 100	1.2–1.4	High efficiency grade particularly suited to counter-flow regenerated packed bed systems.

NOTE: Most resins presented in this catalog can be supplied as Purofine™ and Puropack™ grades (specific literature available). Mean diameters can vary for different ionic forms. Please see individual product data sheets.

\*Is a measure of the uniformity of the particle size distribution. Uniformity coefficient ranges between 1.0-1.7. The closer to 1.0, the more uniform the beads.



Ecolab weak base anion exchangers are used in the demineralization process of gelatin and collagen.

# Shallow Shell™ Technology Products

Ecolab's Shallow Shell technology or SST™, is designed to improve softening and demineralization performance. Our R&D and manufacturing teams perfected an advanced resin bead structure to increase regeneration efficiency, reduce leakage and fouling and conserve rinse and dilution water so that systems run better, with less expense and enhanced performance.

Key Advantages:

- Requires less regenerant chemicals to achieve equal or better operating performance
- Provides savings in rinse and dilution water
- Reduces leakage at same regenerant dosage as traditional resin
- Suitable for co-flow, counter-flow and packed bed systems
- Supports ISO 14001:2015 initiatives toward environmental management and impact; uses less chemical regenerant and generates less waste

Product	Type	Ionic Form	Dry Weight Capacity (min.) (eq/dry kg)*	Moisture Retention (%)	Specific Gravity	Reversible Swelling (max. %)	Remarks & Applications
<b>SSTC60</b>	Strong Acid Cation Gel Polystyrenic	Na <sup>+</sup>	3.8*	38–46	1.20	Na <sup>+</sup> →H <sup>+</sup> 8	Also available in uniform particle size as Shallow Shell SSTPPC60. Increased resistance to iron and manganese fouling over standard softening resins.
<b>SSTC80</b>	Strong Acid Cation Gel Polystyrenic	Na <sup>+</sup>	4.0*	42–48	1.20	Na <sup>+</sup> →H <sup>+</sup> 7	Primarily used for softening high TDS water at elevated temperature.
<b>SSTC104</b>	Weak Acid Cation Gel Acrylic	H <sup>+</sup>	5.5*	36–44	1.17	H <sup>+</sup> →Ca <sup>2+</sup> 20 H <sup>+</sup> →Na <sup>+</sup> 60	Primarily used for high TDS softening. High efficiency and less susceptible to heavy metal fouling. Very low rinse water requirements.
<b>SSTA63</b>	Type II Gel Polystyrenic Strong Base Anion	Cl <sup>-</sup>	2.6*	37–45	1.12	Cl <sup>-</sup> →OH <sup>-</sup> 15	Primarily used for high performance demineralization. High operating capacity and good silica removal.
<b>SSTA64</b>	Type I Gel Polystyrenic Strong Base Anion	Cl <sup>-</sup>	2.7*	43–51	1.08	Cl <sup>-</sup> →OH <sup>-</sup> 20	Primarily used for high performance demineralization. Excellent silica removal.

\* SST products typically have equal to higher operating capacities than standard grade ion exchange resin based on multiple cycles. Capacity expressed in dry weight capacity in eq/kg.



For all resin beads to work, they need to be activated. Our exclusive process leaves the center of each SST bead inactive. This eliminates the sites that take the longest to exchange, are the most difficult to regenerate and are the most susceptible to fouling.

# Organics Removal

Organic materials can cause unwanted color, taste and odor in potable water supplies. Organics also represent a fouling threat to anion resins of demineralization plants and to reverse osmosis membranes. To remove organic matter, collectively measured as TOC (Total Organic Carbon), COD (Chemical Oxygen Demand) or BOD (Biological Oxygen Demand), Ecolab offers a variety of brine regenerable strong base anion resins: gel polystyrenic, macroporous polystyrenic and macroporous polyacrylic. The degree of reduction depends on the specific nature of the TOC as well as the choice of resin, its porosity, contact time and resistance to irreversible fouling.

Product	Type	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Specific Gravity	Remarks & Applications
<b>A420S</b>	Type I Gel Polystyrenic SBA	Cl <sup>-</sup>	0.8	60–65	1.04	Reversible uptake of large organic molecules. Ideal for sugar applications.
<b>A502P</b>	Type I Macroporous Polystyrenic SBA	Cl <sup>-</sup>	0.8	66–72	1.04	Styrenic based organic scavenger used to reduce NOM (Natural Organic Matter) and color levels of raw waters. Prevents organic fouling of downstream anion resins. S grade used for sugar decolorization.
<b>A860</b>	SBA Macroporous Polyacrylic	Cl <sup>-</sup>	0.8	66–72	1.08	Acrylic based organic scavenger with high reversible sorptive capacity, better suited to brine-only regeneration than A502P. S grade primarily used for sugar decolorization.
<b>TANEX™</b>	SBA Type I Macroporous	Cl <sup>-</sup>	—	68–75	—	Optimized blend of different resin chemistries and resin matrices for simultaneous colloid, tannin and other natural organic matter removal.



Organic materials can cause unwanted color, taste and odor in potable water supplies. To remove organic matter, Ecolab offers a variety of brine regenerable strong base anion resins.

# Ready to Use Mixed Beds

Ecolab ready to use mixed bed resins are specially prepared high-quality resin mixtures designed for direct purification of water. The ratio of component resins is engineered to meet the specific requirements of each application, in order to provide the highest capacity in each situation. Performance of our ready to use mixed bed products depends on the application and on the plant layout. Several of the mixed bed resins are available with indicators which facilitate ease of operation when a simple visual indication of exhaustion is desired.

Product	Ionic Form	Cation Component	Anion Component	Remarks & Applications
<b>MB400</b>	H <sup>+</sup> /OH <sup>-</sup>	40% Strong Acid Cation Gel	60% Strong Base Anion Gel Type I	For the production of high-purity, silica-free demineralized water. Primarily used in working mixed beds or polishing for industrial water. High operating capacity, achieving conductivities less than 0.1 µS/cm in many polishing applications. Our most popular mixed bed.
<b>MB410</b>	H <sup>+</sup> /OH <sup>-</sup>	35% Strong Acid Cation Gel	65% Strong Base Anion Gel Type I	Higher anion capacity mixed bed, particularly suited for the treatment of RO permeates which contain high amounts of CO <sub>2</sub> .
<b>MB3710</b>	H <sup>+</sup> /OH <sup>-</sup>	40% Strong Acid Cation Gel	60% Strong Base Anion Gel Type I	This product is the highest quality industrial grade mixed bed used in polishing demineralization offering enhanced performance.
<b>MB478</b>	H <sup>+</sup> /OH <sup>-</sup>	50% Strong Acid Cation Gel	50% Strong Base Anion Gel Type I	High cation capacity mixed bed, specific for the EDM market (spark erosion machining).
<b>MB46</b>	H <sup>+</sup> /OH <sup>-</sup>	50% Strong Acid Cation Gel	50% Strong Base Anion Gel Type I	Higher capacity. Resin is further processed for critical applications. Also used for direct treatment of raw waters with high alkalinity.

NOTE: Many other special customized mixed beds are produced with and without indicators, consult your local Ecolab sales office.

## Ready to Use Mixed Beds with Indicator

Product	Ionic Form	Color Change On Exhaustion	Cation Component	Anion Component	Remarks & Applications
<b>MB400IND</b>	H <sup>+</sup> /OH <sup>-</sup>	Blue (regenerated) Amber (exhausted) Indicator on anion component	40% Strong Acid Cation Gel	60% Strong Base Anion Gel Type I	Same performance as MB400 above but with a color indicator on exhaustion.
<b>MB500VC</b>	H <sup>+</sup> /OH <sup>-</sup>	Green (regenerated) Blue (exhausted) Indicator on cation component	40% Strong Acid Cation Gel	60% Strong Base Anion Macroporous Type I	High-contrast color change mixed bed with a UV stable indicator for the production of high quality demineralized water. Used in polishing units and direct treatment of raw waters.
<b>MB59VC</b>	H <sup>+</sup> / Free Base	Green (regenerated) Blue (exhausted) Indicator on cation component	60% Strong Acid Cation Gel	40% Weak Base Anion Macroporous	Very high capacity mixed bed with a WBA component for the production of partially demineralized water, where removal of CO <sub>2</sub> and SiO <sub>2</sub> is not required. Typical run end point of 30–50 µS/cm.

NOTE: Many other special customized mixed beds are produced with and without indicators, consult your local Ecolab sales office.

# UltraClean™ Products for Ultrapure Water

Ecolab ion exchange resins for ultrapure water meet the precise needs of the electronics industry for wafer and microchip production. These needs require the highest possible water quality (< 1 ppb Total Organic Carbon (TOC) and > 18.2 MΩ·cm resistivity, with minimum rinse times), while eliminating contamination of the high purity circuits when ion exchange resin is first installed.

All UltraClean resins undergo treatment to remove the organic residuals that are left on ion exchange resins after manufacturing. They are highly regenerated in the H<sup>+</sup> and OH<sup>-</sup> forms.

Product	Type	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Specific Gravity Moist Beads	Remarks & Applications
<b>ULTRACLEAN UCW9126</b>	Gel Strong Acid Cation	H <sup>+</sup>	1.9	49–54	1.21	Ultrapure water cation resin with very low TOC release operating in single beds or mixed beds with anion component UltraClean UCW5072.
<b>ULTRACLEAN UCW5072</b>	Gel Strong Base Anion	OH <sup>-</sup>	1.0	52–58 (Cl <sup>-</sup> form)	1.07	Ultrapure water anion resin with very low TOC release operating in single beds or mixed beds with cation component UltraClean UCW9126.
<b>ULTRACLEAN UCW1080</b>	Macroporous Complex Amine	Free Base	0.6	61–67 (Cl <sup>-</sup> form)	1.10	Semiconductor industry – Ultrapure water for selective boron removal to non-detectable (ND) levels.

## Ultrapure Water Mixed Beds

Product	Ionic Form	Total Volume Capacity (min.) (eq/L)	Moisture Retention (%)	Remarks & Applications
<b>ULTRACLEAN UCW9964</b>	H <sup>+</sup> / OH <sup>-</sup>	Cation: 1.9 Anion: 1.0	Cation: 49–54 Anion: 52–58 (Cl <sup>-</sup> form)	Highest purity separable MB for final polishing and point of use treatment for UPW systems. Highest resistivity and very low TOC release.
<b>ULTRACLEAN UCW9966</b>	H <sup>+</sup> / OH <sup>-</sup>	Cation: 1.9 Anion: 1.0	Cation: 49–54 Anion: 52–58 (Cl <sup>-</sup> form)	Highest purity non separable MB for final polishing and point of use treatment for UPW systems. Highest resistivity and very low TOC release.
<b>ULTRACLEAN UCW3600</b>	H <sup>+</sup> / OH <sup>-</sup>	Cation: 1.9 Anion: 1.1	Cation: 49–54 Anion: 55–62	High operating capacity separable mixed bed for UPW systems.
<b>ULTRACLEAN UCW3700</b>	H <sup>+</sup> / OH <sup>-</sup>	Cation: 1.9 Anion: 1.0	Cation: 49–54 Anion: 60–70	Separable mixed bed for UPW systems.
<b>ULTRACLEAN UCW3900</b>	H <sup>+</sup> / OH <sup>-</sup>	Cation: 2.0 Anion: 1.0	Cation: 46–50 Anion: 60–70	Separable mixed bed with higher cation capacity for UPW systems.

NOTE: The ratio of Cation to Anion is chemically equivalent at 1:1.

# CriticalResin™ Nuclear Grade Products

Ecolab nuclear grade CriticalResin NRW ion exchange resins are designed exclusively for use in nuclear power operations and backed by our technical support team. All nuclear grade resins meet the highest published quality specifications required by nuclear power industry worldwide. Ecolab's diverse nuclear grade product line allows power plants to address all areas of water purification within nuclear operations.

Product(s)	Type	Ionic Form	Total Capacity (min.) (eq/L)	Moisture Retention (%)	Remarks & Applications
<b>NRW100</b>	Gel Strong Acid Cation	H <sup>+</sup>	1.8	49–55	Make up demineralization and radwaste systems.
<b>NRW1100*</b>	Gel Strong Acid Cation	H <sup>+</sup>	2.0	46–50	Used in separate bed cation vessels for polishing or layered on mixed bed resins for added cation capacity. Also available in Li <sup>+</sup> and <sup>7</sup> Li <sup>+</sup> forms.
<b>NRW1160*</b> (1)	Gel Strong Acid Cation	H <sup>+</sup>	2.5	32–41	Primary delithiation and as cation in CVCS polishing mixed beds. Condensate polishing cation component for non-regenerable applications.
<b>NRW160</b> <b>NRW1600*</b> (1)	Macroporous Strong Acid Cation	H <sup>+</sup>	2.1	43–48	Layering on polishing mixed beds. Primary purification cation beds for delithiation and outage clean up. Selective for divalent metal isotopes and <sup>137</sup> Cs. Also available in Li <sup>+</sup> and <sup>7</sup> Li <sup>+</sup> form. Condensate polishing cation component for non-regenerable applications.
<b>NRW400</b>	Gel Strong Base Anion	OH <sup>-</sup>	1.0	48–54 (Cl <sup>-</sup> form)	Anion used in regenerable nuclear makeup systems and separated bed radwaste systems. Also used in regenerable mixed beds and mixed beds for radwaste.
<b>NRW600</b> (2)	Gel Strong Base Anion	OH <sup>-</sup>	1.1	45–53 (Cl <sup>-</sup> form)	Primary cleanup, deboration beds, and secondary separate bed demineralizer anion. Also used as underlay in condensate polishing.
<b>NRW8000*</b>	Gel Strong Base Anion	OH <sup>-</sup>	1.3	40–45 (Cl <sup>-</sup> form)	High-capacity anion for condensate polishing, BWR deep bed condensate polishing, separate bed demineralizer anion or as underlay in condensate polishing.
<b>NRW5010</b> (3)	Macroporous Strong Base Anion	OH <sup>-</sup>	0.4	70–75 (Cl <sup>-</sup> form)	Special nuclear grade colloid removal resin for surface layer on mixed beds to achieve ultra-polishing of primary coolant and radwaste.
<b>NRW5070</b> (3)	Macroporous Strong Base Anion	OH <sup>-</sup>	1.0	50–55 (Cl <sup>-</sup> form)	Special nuclear grade colloid removal resin with mechanical durability for surface layer on mixed beds to achieve ultra-polishing of primary coolant and radwaste.
<b>NRW5330B</b>	Iron Impregnated Macroporous Strong Base Anion	Borate	—	—	Spent fuel pool for removal of trace heavy metals such as antimony and nickel. Used for silica removal.

NOTE: (1) Available in low sodium (LS) version for polishing steam generator blowdown and layering on polishing mixed beds when operating past amine breaks.

(2) Available in extra low chloride (XLC) version for used in lithiated polishing mixed bed.

(3) Available in extra low chloride (XLC) version.

\* Uniform particle size

## CriticalResin Nuclear Grade Mixed Beds

Product	Ionic Form	Components	Component Capacities (min.) (eq/L)	Remarks & Applications
<b>NRW3240</b>	H <sup>+</sup> /OH <sup>-</sup> (1) (2)	Gel Cation Gel Anion	1.8/1.0	Primary polishing, clean up systems and radwaste.
<b>NRW3460</b>	H <sup>+</sup> /OH <sup>-</sup> (1) (2)	Gel Cation Gel Anion	2.0/1.1	Higher total capacity version of CriticalResin NRW3240 for primary polishing, clean up systems and radwaste.
<b>NRW3560</b>	H <sup>+</sup> /OH <sup>-</sup> (1) (3) (4)	Macroporous Cation Gel Anion	2.1/1.1	Mixed bed with very high capacity and porous cation for primary purification, steam generator blow down and spent fuel pool demineralization.
<b>NRW3670</b>	H <sup>+</sup> /OH <sup>-</sup> (3)	Gel Cation Gel Anion	2.5/1.15	Primary polishing, condensate polishing, spent fuel pool demineralizer, steam generator blow down demineralizer and reactor water clean up.

(1) Cation component available in <sup>7</sup>Li<sup>+</sup> form. (2) Cation component available in Li<sup>+</sup> form. (3) Available in low sodium (LS) version. (4) Available in extra low chloride (XLC) version.

## Purity of Nuclear Grade Ion Exchangers

### Cation Resins

Ionic Form	Conversion
H <sup>+</sup>	99.9% min.
Li <sup>+</sup> or <sup>7</sup> Li <sup>+</sup>	99.9% min.

### Impurities

Impurities	Mg/Kg Dry
Sodium	#40 max.
Iron	50 max.
Heavy Metals as Lead	40 max.

### Anion Gel Resins

Ionic Form	Conversion
OH <sup>-</sup>	95% min.
CO <sub>3</sub> <sup>2-</sup>	5% max.
§*Cl <sup>-</sup>	0.1% max.
**SO <sub>4</sub> <sup>2-</sup>	0.1% max.

### Impurities

Impurities	Mg/Kg Dry
Sodium	20 max.
Iron	50 max.
Heavy Metals as Lead	30 max.

### NOTES:

Nuclear grade mixed beds are normally supplied with near stoichiometric equivalents of anion and cation resin sites. Other ratios can be supplied on request.

Ecolab Nuclear Grade Products are in operation within the defense industry or nuclear power stations in the Americas, Europe and Asia and carry formal approvals from leading operators of nuclear installations. They meet internationally recognized specifications from the leading suppliers of nuclear power station designs.

#Certain Nuclear Grade Cation and Mixed Bed Products are available as low sodium (LS) version, which have an extra low sodium content of 10 ppm mg/kg dry maximum.

§Certain Nuclear Grade Anion and Mixed Bed Products are available as extra low chloride (XLC) version, which have an extra low ionic chloride content of 0.05% maximum.

\*0.2% max. for CriticalResin NRW5070

\*\*0.2% max. for CriticalResin NRW5070, 0.3% max. for CriticalResin NRW5010



Ecolab's diverse CriticalResin NRW nuclear grade product line meets the highest published quality specifications required by the nuclear power industry worldwide and allows power plants to address all areas of water purification within nuclear operations.

# Condensate Polishing Products

Condensate polishing normally applies to the treatment of condensed steam from turbines operating in the power industry. It can also be applied to condensed steam from any steam system being returned to the boiler. The ultimate goal of condensate polishing is to remove all soluble impurities and protect the high-pressure boilers. Note: For nuclear condensate polishing products, please see Nuclear Grade Products.

## Deep Bed Condensate Polishing Cations

Product	Type	Total Capacity (min.) (eq/L)	Moisture Retention (%)	Particle Size (µm)	Remarks & Applications
<b>SUPERGEL SGC650H</b>	Gel Strong Acid Cation	2.0 (H <sup>+</sup> form)	46–50 (H <sup>+</sup> form)	Mean Diameter 670 ± 50	Highly crosslinked, high capacity, uniform particle size for excellent chemical and hydraulic performance.
<b>SUPERGEL SGC100X10TLH</b>	Gel Strong Acid Cation	2.0 (H <sup>+</sup> form)	45–49 (H <sup>+</sup> form)	710–1200	Highly crosslinked, high capacity, coarse particle size for enhanced separation from the anion component. Suitable for Trilite MB.
<b>C150MBH</b>	Macroporous Strong Acid Cation	1.8 (Na <sup>+</sup> form)	54–59 (H <sup>+</sup> form)	425–1200	High mechanical and osmotic stability.
<b>C150TLH</b>	Macroporous Strong Acid Cation	1.8 (Na <sup>+</sup> form)	54–59 (H <sup>+</sup> form)	710–1200	High mechanical and osmotic stability, coarse particle size for enhanced separation from the anion component. Suitable for Trilite MB.
<b>PPC150H</b>	Macroporous Strong Acid Cation	1.8 (Na <sup>+</sup> form)	54–59 (H <sup>+</sup> form)	Mean Diameter 760 ± 100	High mechanical and osmotic stability, uniform particle size for excellent chemical and hydraulic performance.

NOTE: All products are also available in Na<sup>+</sup> form, if required. Certain amine form products are available upon request.

## Deep Bed Condensate Polishing Anions

Product	Type	Total Capacity (min.) (eq/L)	Moisture Retention (%)	Particle Size (µm)	Remarks & Applications
<b>SUPERGEL SGA550MB</b>	Gel Strong Base Anion	1.4 (Cl <sup>-</sup> form)	43–48 (Cl <sup>-</sup> form)	Mean Diameter 550 ± 50	Highly crosslinked, high capacity, uniform particle size for excellent chemical and hydraulic performance. Also available in SO <sub>4</sub> <sup>2-</sup> and OH <sup>-</sup> form.
<b>A500MBPlus</b>	Macroporous Strong Base Anion	1.1 (Cl <sup>-</sup> form)	54–65 (Cl <sup>-</sup> form)	425–1200	High mechanical and osmotic stability.
<b>A500TLPlus</b>	Macroporous Strong Base Anion	1.1 (Cl <sup>-</sup> form)	54–65 (Cl <sup>-</sup> form)	425–850	High mechanical and osmotic stability, small particle size for enhanced separation from the cation component. Suitable for Trilite MB. Also available in SO <sub>4</sub> <sup>2-</sup> form.
<b>PFA500MBPlus</b>	Macroporous Strong Base Anion	1.1 (Cl <sup>-</sup> form)	54–65 (Cl <sup>-</sup> form)	Mean Diameter 570 ± 50	High mechanical and osmotic stability, uniform particle size for excellent chemical and hydraulic performance.

NOTE: All anion products listed here are antistat treated to minimize clumping between cation and anion components. All products can be supplied without antistat treatment upon request.

# Microlite™ Products

The Microlite series includes individual anion and cation exchangers as well as premixed powdered ion exchange resin-fiber blends that were developed for use in various condensate polishing systems for the power industry. They offer the flexibility of pre-mixed, ready to use products. Ecolab is the only manufacturer of powdered resin that makes the base ion exchange components.

The Microlite brand products are available in many forms:

- MB Series: hydrogen/hydroxide forms and custom blends
- CG Series: hydrogen/hydroxide forms with fiber
- PR Series: individual anion or cation component
- FC Series: fiber

Product	Type	Functional Group	Ionic Form	Total Capacity (min.) eq/dry kg)*	Moisture Content (%)	Standard Packaging Dry Weight (kg)	Remarks & Applications
<b>MICROLITE PrCH</b>	Cation	Sulfonic	H <sup>+</sup>	4.8	45–62	8.8 (19.5 lb.)	Powdered cation hydrogen form.
<b>MICROLITE PrAOH</b>	Anion	Quaternary Ammonium	OH <sup>-</sup>	4.0	50–60	5.7 (12.5 lb.)	Powdered anion hydroxide form.
<b>MICROLITE FC+</b>	Cellulose Fiber	Inert	—	—	55–75	4.55 (10 lb.)	Specialty cellulose fiber.

\* Capacity expressed in dry weight capacity in eq/kg.

## Powdered Resin Premixes

Product	Type	Functional Group	Ionic Form	Total Capacity (min.) eq/dry kg)*	Ratio Cation : Anion (Dry Wt.)	Ratio Fiber : Resin	Standard Packaging Dry Weight (kg)	Remarks & Applications
<b>MICROLITE CG19H</b>	Cation/Anion/Fiber	Sulfonic/Quaternary Ammonium	H <sup>+</sup> /OH <sup>-</sup>	4.8/4.0	4 : 5	1 : 9	5.45 (12 lb.)	Resin/fiber blend. Also available in ammonium/hydroxide form.
<b>MICROLITE CG4H</b>	Cation/Anion/Fiber	Sulfonic/Quaternary Ammonium	H <sup>+</sup> /OH <sup>-</sup>	4.8/4.0	1 : 1	1 : 1	5.45 (12 lb.)	Resin/fiber blend. Also available in ammonium/hydroxide form.
<b>MICROLITE MB1/1H</b>	Cation/Anion	Sulfonic/Quaternary Ammonium	H <sup>+</sup> /OH <sup>-</sup>	4.8/4.0	1 : 1	—	5.45 (12 lb.)	Also available in ammonium/hydroxide form.

\* Capacity expressed in dry weight capacity in eq/kg.

# Hydrometallurgical Products

Metals can be extracted from ores using several methods including hydrometallurgy, pyrometallurgy or physical means and their combinations. Hydrometallurgy is the process of extracting metals from ores by transferring the metal of interest from the ore into an aqueous phase and recovering the metal from the resulting pregnant liquor. Ecolab has supplied ion exchange and chelating resins to the hydrometallurgy industry for over 30 years. Advanced ion exchange technology is used for the primary recovery of metal or the removal of impurities to increase the value and purity of the final product.

Applications of ion exchange in hydrometallurgy include gold recovery, uranium recovery, molybdenum recovery, impurity removal and effluent treatment to ensure adherence to environmental standards to allow recycling and re-use.

Product	Type	Functional Group	Ionic Form	Total Capacity (min.)	Moisture Retention (%)	Remarks & Applications
<b>PUROGOLD™ MTA1930</b>	Macroporous Mixed Base Anion	Mixed Weak and Strong Base Groups	Cl <sup>-</sup>	3.5 eq/kg	45–53	Low strong base capacity resin for recovery of gold from ores by cyanide leach process. Elution of gold with acidic thiourea. Suitable for RIP process. 800–1300 µm grading.
<b>PUROGOLD MTA9920</b>	Macroporous Mixed Base Anion	Mixed Amines	Free Base	4.4 eq/kg (Cl <sup>-</sup> form)	47–55 (Cl <sup>-</sup> form)	Medium base resin for recovery of gold from alkaline cyanide leach liquor. Simplified elution of gold with alkaline sodium cyanide. Suitable for use in RIP process. 800–1300 µm grading.
<b>PUROGOLD MTA5013S04</b>	Macroporous Strong Base Anion	Quaternary Ammonium	SO <sub>4</sub> <sup>2-</sup>	1.1 eq/L (Cl <sup>-</sup> form)	54–62 (Cl <sup>-</sup> form)	For recovery of gold complexes obtained from the thiosulfate processing of gold ore. Suitable for RIP process. 1000–1600 µm grading.
<b>PUROMET™ MTA6002PF</b>	Gel Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	1.6 eq/L	40–45	For the extraction of uranyl sulfate and carbonate complexes from the leachates originated from ISL, batch or heap leaching process. Uniform particle size. Mean diameter 520-620 µm grading.
<b>PUROMET MTA6601</b>	Gel Strong Base Anion	Pyridinium	Cl <sup>-</sup>	1.2 eq/L	44–52	For the extraction of uranyl sulfate complexes from the sulfuric leachates. Suitable for RIP process. 800–1400 µm grading.

## Hydrometallurgical Resins (Cont'd)

Product	Type	Functional Group	Ionic Form	Total Capacity (min.)	Moisture Retention (%)	Remarks & Applications
<b>PUROMET</b> <b>MTA4601PFSO4</b>	Gel Strong Base Anion	Pyridinium	SO <sub>4</sub> <sup>2-</sup>	1.3 eq/L (Cl form)	47–54 (Cl form)	For the extraction of uranyl sulfate complexes from the clean sulfuric solutions. Uniform particle size. Mean diameter 520–620 µm grading.
<b>PUROMET</b> <b>MTS9300</b>	Macroporous Chelating	Iminodiacetic	Na <sup>+</sup>	50 g Cu/L	52–60	For base metals recovery from weak acid solutions. Widely used as a general metals polisher from a wide variety of wastes. Extremely high copper capacity. Countless applications in non-ferrous hydrometallurgy.
<b>PUROMET</b> <b>MTS9320</b>	Macroporous Chelating	Iminodiacetic	Na <sup>+</sup>	50 g Cu/L	54–62	For base metals recovery from weak acid solutions. Widely used as a general metals polisher from a wide variety of wastes. Extremely good kinetics and high operating capacity. Numerous applications in non-ferrous hydrometallurgy.
<b>PUROMET</b> <b>MTS9301</b>	Macroporous Chelating	Iminodiacetic	Na <sup>+</sup>	50 g Cu/L	52–60	For base metals recovery from weak acid solutions. Suitable for RIP process. 800–1300 µm grading.
<b>PUROMET</b> <b>MTS9500</b>	Macroporous Chelating	Aminophosphonic (Amino Methyl Phosphonic)	Na <sup>+</sup>	1.3 eq Ca/IL	55–65	For sorption of zinc, iron and other metals from weak acidic solutions. For recovery of uranium from phosphoric acid and NiSO <sub>4</sub> purification.
<b>PUROMET</b> <b>MTS9600</b>	Macroporous Chelating	Bis-picolyamine	SO <sub>4</sub> <sup>2-</sup>	35 g Cu/L	45–60	Purification of plating baths and copper removal from acid solutions. Separation of cobalt and nickel.
<b>PUROMET</b> <b>MTA1701</b>	Macroporous Weak Base Anion	Complex Amine	Free Base	1.3 eq/L	43–46 (Cl form)	For selective sorption of rhenium from acid streams. Suitable for RIP process. 600–1200 µm grading.
<b>PUROMET</b> <b>MTS9840</b>	Macroporous Weak Base/ Chelating	Polyamine	Free Base	2.7 eq/L	50–56	For tungsten impurity removal from molybdate solutions.
<b>PUROMET</b> <b>MTS9570</b>	Macroporous Strong Acid Cation/ Chelating	Mixed Sulfonic and Phosphonic	H <sup>+</sup>	18 g Fe/L	55–70	For removal of ferric iron from copper, nickel or cobalt electrolytes as well as molybdenum sorption from strong acid solutions.

NOTE: Some products can be supplied in customized ionic form.

# Puromet™ Metals Plating Products

Large amounts of water are used in the plating processes to make-up treatment baths and to rinse away residual salts, acids or alkalis from treated parts. Typically, after each step of the process, the material is rinsed with water which is conveniently recycled after demineralization with special ion exchange resins. Ion exchange resins and synthetic adsorbents can be used in the metal plating industry even to remove impurities from pickling and plating liquors, so extending their lifetime. Treatment of effluents removes toxic metals, allowing safe disposal of the waste liquor.

Product	Type	Functional Group	Ionic Form	Total Capacity (min.)	Moisture Retention (%)	Remarks & Applications
<b>PUROMET MTC1500</b>	Macroporous Strong Acid Cation	Sulfonic	Na <sup>+</sup>	1.8 eq/L	48–53	Metals and cations removal in rinse waters demineralization and recycling.
<b>PUROMET MTC1600</b>	Macroporous Strong Acid Cation	Sulfonic	Na <sup>+</sup>	2.3 eq/L	35–40	Galvanic baths rejuvenation. Very high capacity and resistance to oxidation.
<b>PUROMET MTA1000</b>	Macroporous Weak Base Anion	Tertiary Amine	Free Base	1.3 eq/L	53–62 (Cl <sup>-</sup> form)	Strong acids and cyanide complexes removal in rinse waters demineralization and recycling.
<b>PUROMET MTA1030</b>	Macroporous Weak Base Anion	Tertiary Amine	Free Base	1.5 eq/L	51–58 (Cl <sup>-</sup> form)	Higher capacity and higher stability WBA resin for rinse waters demineralization and recycling.
<b>PUROMET MTA1330</b>	Macroporous Weak Base Anion	Tertiary Amine	Free Base	1.7 eq/L	46–54 (Cl <sup>-</sup> form)	Very high capacity WBA resin for longer production cycles in rinse waters demineralization and recycling.
<b>PUROMET MTA5000</b>	Type I Macroporous Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	1.1 eq/L	54–65	Weak acid anions removal in rinse waters demineralization and recycling. Superior performances in fluoride, silica and boron removal.
<b>PUROMET MTA5100</b>	Type II Macroporous Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	1.1 eq/L	50–60	High operating capacity for cyanide, silica and weak acid anions removal in rinse waters demineralization and recycling.
<b>PUROMET MTA5500</b>	Type I Gel Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	1.4 eq/L	43–48	Iron and other metals removal from concentrated HCl baths.
<b>PUROMET MTA8500</b>	Gel Acrylic Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	1.2 eq/L	57–62	SBA resin with high resistance to organic fouling in rinse waters demineralization and recycling. Acid retardation.
<b>PUROMET MTA8700</b>	Gel Acrylic Mixed Base Anion	Quaternary Ammonium	Free Base/ Cl <sup>-</sup>	1.25 eq/L (Cl <sup>-</sup> form)	56–62 (Cl <sup>-</sup> form)	Mixed base resin for rinse waters demineralization and recycling. High operating capacity coupled with the capability to remove traces of weak acid anions. Excellent resistance to organic fouling.
<b>PUROMET MTA4001SO4</b>	Type I Gel Strong Base	Quaternary Ammonium	SO <sub>4</sub> <sup>2-</sup>	1.3 eq/L (Cl <sup>-</sup> form)	48–54 (Cl <sup>-</sup> form)	Recovery of traces of precious metals from cyanide solutions.

# Chelation Products

Ecolab's wide range of chelating resins contain special functional groups that gives these resins superior selectivity for specific target metals. Chelation resins are found in a wide range of metal removal and recovery applications, from the primary recovery of precious metals as well as the removal of impurities that may be present as mere traces. Typical applications include brine purification in the chlor-alkali industry, extraction and purification of base metals (copper, nickel, cobalt, zinc), removal of boron from potable and process water, recovery of precious metals, removal of toxic metals like mercury and many others. Regenerable and non-regenerable chelating resins are available to cover all different needs.

Product	Functional Group	Ionic Form	Capacity (min.)	Moisture Retention (%)	Remarks & Applications
<b>PUROMET MTS9100</b>	Amidoxime	Free Base	40 g Cu/L	52–60	Selective removal of heavy metals. Recovery of precious metals. Extraction of gallium from Bayer liquor.
<b>PUROMET MTS9140PF</b>	Thiourea		1 eq/L	50–56	High selectivity and high capacity for mercury removal from brine and effluent from chlor-alkali process. Selective recovery of precious metals (gold, platinum, palladium, etc.) from acidic solutions. Stable over entire pH range. Non-regenerable use.
<b>PUROMET MTS9200</b>	Isothiuronium	H <sup>+</sup>	300 g Hg/L	48–54	High selectivity and high capacity for mercury removal in wastewaters. Widely used for final polishing to meet mercury discharge limits. Selective recovery of precious metals (gold, platinum, palladium, etc.) from acidic solutions. Non-regenerable use.
<b>PUROMET MTS9500</b>	Aminophosphonic (Amino Methyl Phosphonic)	Na <sup>+</sup>	1.3 eq Ca/L	55–65	Selective removal of heavy metals from wastewaters. Purification of selected plating baths in the surface finishing industry. (i.e. bright nickel bath rejuvenation).
<b>PUROMET MTS9600</b>	Bis-picolylamine	SO <sub>4</sub> <sup>2-</sup>	35 g Cu/L	45–60	High affinity for transition metals, even at very low pH or in the presence of complexing agents. Useful for cobalt electrolyte purification and Cr(III) plating bath purification.
<b>PUROMET MTS9850</b>	Polyamine	Free Base	2.3 eq/L	56–63	Removal of heavy metals present in complexed form (e.g., EDTA complexes) from wastewaters.
<b>S108</b>	N-methylglucamine	Free Base	0.6 eq/L	60–66 (Cl form)	Selective removal of boron from potable water and water used in agriculture/ horticulture irrigation. Also, for use in wastewater and process water applications.
<b>S930Plus</b>	Iminodiacetic	Na <sup>+</sup>	50 g Cu/L	52–60	Purification of brine in chlor-alkali plants offering highly efficient removal of strontium.
<b>S9320</b>	Iminodiacetic	Na <sup>+</sup>	50 g Cu/L	54–62	Purification of brine in chlor-alkali plants offering highly efficient removal of strontium. Higher operating capacity and kinetics, high mechanical and osmotic strength.
<b>S940</b>	Aminophosphonic	Na <sup>+</sup>	1.0 eq Ca/L	55–65	Used in purification of brine in chlor-alkali plants where strontium control is not required.

# Potable and Groundwater Products

Ecolab is at the forefront in meeting the new challenges of purifying water for potable use. We continue to develop specialized ion exchange resins and adsorbent solutions focused on reducing waste and operating costs. The wide variety of contaminants that need removal often requires a customized approach.

Some contaminants are removed by relying largely on the ion exchange properties of our resins (e.g., nitrate, hexavalent chromium and uranium) while others (e.g., perchlorate and PFAS) rely on the combination of unique ionic, adsorptive and hydrophobic characteristics of our specialty resins. Special ion exchange resins, chelating resins, hybrid media and granular products are available to target almost all contaminants potentially impacting the quality of the water we drink.

Product	Type	Functional Group	Ionic Form	Total Capacity (min.) (eq/L)	Moisture Retention (%)	Remarks & Applications
<b>C120E</b>	Gel Strong Acid Cation	Sulfonic Acid	Na <sup>+</sup>	1.5	56–60	Designed especially for small scale domestic softening.
<b>C100E</b>	Gel Strong Acid Cation	Sulfonic Acid	Na <sup>+</sup>	1.9	46–50	Softening and demineralization resin, widely used in industrial and domestic applications.
<b>C100x10E</b>	Gel Strong Acid Cation	Sulfonic Acid	Na <sup>+</sup>	2.2	40–43	Softening and demineralization resin, for potable applications. High resistance to oxidation.
<b>SSTC6000E</b>	Shallow Shell Strong Acid Cation	Sulfonic Acid	Na <sup>+</sup>	3.8*	40–48	SST resin for high efficiency potable water softening and iron removal.
<b>C104EPlus</b>	Porous Polyacrylic Weak Acid Cation	Carboxylic Acid	H <sup>+</sup>	4.7	45–55	Designed for softening, dealkalization and partial deionization applications.
<b>FBC1047</b>	Porous Polyacrylic Weak Acid Cation	Carboxylic Acid	H <sup>+</sup>	4.3	45–55	Designed for softening, dealkalization, and partial deionization applications. Increased oxidation resistance.
<b>C107E</b>	Porous Polyacrylic Weak Acid Cation	Carboxylic Acid	H <sup>+</sup>	3.6*	53–58	Specifically designed dealkalization resin for use in small cartridges for domestic applications. Not usually regenerated.
<b>C115E</b>	Porous Polymethacrylic Weak Acid Cation	Carboxylic Acid	H <sup>+</sup>	3.5	46–53	Very weakly acidic for process applications. Recommended for the Carix™ process.
<b>C100EAg</b>	Gel Strong Acid Cation	Sulfonic Acid	Na <sup>+</sup>	1.9	46–50	Softening resin with bacteriostatic properties containing a small proportion of special silver loaded resin.
<b>A520E</b>	Macroporous Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	0.9	49–56	Selective nitrate removal resin for municipal water, food/drink production and domestic applications.
<b>A530E</b>	Macroporous Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	0.6	50–57	Selective removal of perchlorate, pertechnetate and other oxyanions from water. Regenerable resin.

## Potable and Groundwater (Cont'd)

Product	Type	Functional Group	Ionic Form	Total Capacity (min.) (eq/L)	Moisture Retention (%)	Remarks & Applications
<b>A532E</b>	Gel Strong Base Anion	Complex Amino	Cl <sup>-</sup>	0.7	35–46	Ultra-high selectivity and capacity for perchlorate, pertechnetate and other oxyanions from water.
<b>PFA694E</b>	Gel Polystyrenic	Complex Amino	Cl <sup>-</sup>	—	—	Removal of perfluoroalkyl and polyfluoroalkyl substances. Reduces PFAS to non-detect levels ranging from 1 to 5 parts per trillion.
<b>A600E/9149</b>	Type I Gel Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	1.6	42–45	High capacity resin for removal of nitrate, chromium or uranium in municipal water, food and beverage production and domestic applications.
<b>PGW6002E</b>	Type I Gel Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	1.7	40–45	Very high capacity. Suitable for oxyanion removal such as hexavalent chromate. Both single-use and brine regenerable, depending on influent water chemistry. Buffered version produces treated water with stable pH and chloride to sulfate mass ratio (CSMR), and eliminates extended rinsing at startup.
<b>A200E</b>	Type II Gel Strong Base Anion	Quaternary Ammonium	Cl <sup>-</sup>	1.3	45–51	High-capacity resin offering good silica removal, primarily used in demineralization, dealkalization, and nitrate removal for municipal water, food/drink production and domestic applications.
<b>BROMIDE Plus/9218</b>	Gel Polystyrenic	Proprietary	Cl <sup>-</sup>	—	37–45	Selective removal of bromide ions, to prevent the formation of toxic bromate after water sterilization.
<b>S106</b>	Epoxy	Polyamine	Free Amine	2.0	60–70	High capacity single use resin for hexavalent chromium removal.
<b>S108</b>	Macroporous Anion	N-methylglucamine	Free Base	0.6	60–66 (Cl form)	Selective removal of boron from potable water and water used in agriculture/horticulture irrigation.

NOTE: PFA694E and PGW6002E are also available in a buffered form.

Product	Type	Functional Group	Remarks & Applications
<b>FerriX™ A33E</b>	Macroporous Polystyrenic	Iron oxide infused resin	For arsenic removal. Iron infused, high purity, hybrid media for selective arsenic removal. Effective on both As(V) and As(III).
<b>MZ10Plus</b>	Manganese Zeolite	—	Activated greensand for removal of iron, manganese and hydrogen sulfide from groundwater. Potable water treatment and pre-treatment for ion exchange resins plants.

# Food and Beverage Products

Ecolab provides a comprehensive line of products for food and beverage industry applications including beet sugar refining, cane sugar refining and sugar decolorization along with unique products for new challenges. We also offer a full line of high-performance resins for all corn, wheat and cellulose hydrolysate separations and refining operations along with purification of organic acids.

Application	Products	Process	Solution Treatment
Amino Acids	<a href="#">FBC1000PP</a>	Extraction	Lysine
	<a href="#">A502PS, A510SPlus</a>	Decolorization	MSG
Biomass Purification	<a href="#">C150S, A103SPlus</a>	Demineralization	Cellulose hydrolyzate
	<a href="#">PCR642H</a>	Chromatographic separation	Cellulose hydrolyzate
Collagen	<a href="#">MN102</a>	Taste & odor removal	Collagen
Dairy	<a href="#">C115E, A860S, SP200, Jetted SP200</a>	Extraction	Lactoferrin
	<a href="#">SSTC6000E, A133S</a>	Demineralization	Cheese whey, milk whey
	<a href="#">S108</a>	Decolorization & boron removal	Lactulose
	<a href="#">C100X10, A847S</a>	Demineralization	Lactulose
	<a href="#">PCR642Ca</a>	Chromatographic separation	Lactulose
	<a href="#">MN102</a>	Color, taste & odor removal	Lactulose
Ethanol	<a href="#">C150S, A500SPlus</a>	Demineralization	Ethanol
Fruit Juice	<a href="#">PAD900, MN102, PAD950</a>	Debitting: limonin, naringin	Citrus juices
	<a href="#">A133S</a>	Deacidification	Grapefruit juice, apple juice
	<a href="#">PAD500, PAD600, PAD900, PAD950, MN102</a>	Patulin removal	Apple juice
	<a href="#">PAD500, PAD600, PAD950</a>	Polyphenol recovery	Olives, grapes, berries
	<a href="#">PAD500, PAD600, PAD900, PAD950</a>	Anthocyanin recovery	Berries
Gelatin	<a href="#">PPC150S, A103SPlus, A133S, A845S, A847S</a>	Demineralization	Gelatin
Glycerin	<a href="#">C150S, A103SPlus</a>	Demineralization	Glycerin

## Food and Beverage Products (Cont'd)

Application	Products	Process	Solution Treatment
Organic Acids	<b>C100S, C160S, SSTC6000E, A845S, A847S</b>	Demineralization	Citric
	<b>A847DL</b>	Chromatographic separation	Citric
	<b>C100S, C160S, SSTC6000E, A845S, A847S</b>	Demineralization	Lactic
	<b>A847DL</b>	Chromatographic separation	Lactic
	<b>A847S</b>	Demineralization	Glycolic
Sugar – Beet Sugar	<b>C160S, C100S, SSTC6000E, C107E</b>	Thin juice softening	Sucrose
Sugar – Cane Sugar	<b>A860S, A502PS, A503S, A420S, SSTA64, MN102</b>	Decolorization	Sucrose
	<b>A440S, A500SPlus, C115EC</b>	Demineralization	Sucrose
	<b>MN102</b>	Color, taste and odor removal	Sucrose
	<b>PrAOH</b>	Color and ash polishing	Sucrose
	<b>IP4, IP1</b>	Upflow distributor protection	Sucrose
Sweeteners – Corn/Wheat	<b>A100SPlus, A103SPlus, A133S, A111S, C150S, C160S</b>	Demineralization	Glucose, dextrose, maltodextrin, fructose
	<b>PCR642Ca, SSTPCR642Ca</b>	Chromatographic separation	Fructose
	<b>A510SMBPlus</b>	Mixed bed polishing	Fructose
	<b>MN102, MN152, MN502</b>	Color, taste & odor removal	Fructose, glucose syrups



Bitterness in citrus juices is mainly caused by the presence of limonoids (triterpenes) and flavanone glycosides (flavonoids), such as limonin in orange juice and naringin in grapefruit juice. Ecolab adsorbent resins are utilized in commercial debittering processes.

## Food and Beverage Products (Cont'd)

Application	Products	Process	Solution Treatment
Sweeteners — Dietary Fiber	<a href="#">PCR642K</a>	Chromatographic separation	Polysaccharide
Sweeteners — High Intensity	<a href="#">PCR642Ca</a>	Chromatographic separation	Allulose
Sweeteners — Polyols	<a href="#">A103SPlus, A133S, A500SPlus, C150S, C160S</a>	Demineralization	Sorbitol, maltitol, erythritol
	<a href="#">PCR642Ca</a>	Chromatographic separation	Maltitol
	<a href="#">A500MBPlus, A510SMBPlus</a>	Mixed bed polishing	Sorbitol, maltitol, erythritol
	<a href="#">MN502</a>	Color, taste & odor removal	Sorbitol, maltitol, erythritol
Vitamin E	<a href="#">A503MBOH/4363</a>	Chromatographic separation	Tocopherols
Water Treatment	<a href="#">FBC1047</a>	Softening	Food grade water
Wine	<a href="#">C100S, SSTC6000E</a>	Tartaric stabilization	Wine
	<a href="#">A103SPlus</a>	Volatile acidity removal	Wine permeate

NOTE: MB, PF and PP grades available. Other gradings available upon request.



Ecolab products are used to remove sulfite allergens and provide stabilization of tartrates in wine.

# Chromatographic Separation Products

Ecolab chromatographic separation resins for sweetener and bio-industry separations are high quality polystyrene- and acrylic-based products with uniform spherical beads, suitable for separations which depend on relatively small differences of affinity. They are designed mainly for use in chromatographic columns on an industrial plant scale.

Typical applications are:

- Polyol separation
- Separation of salts and sugars
- Separation of sugars resulting from hydrolysis of biomass
- Separation of acids and sugars from hydrolysis of biomass
- Fructose and allulose enrichment
- Dextrose enrichment
- Beet molasses desugarization

## Cation Separation Resins

Product	Type	Total Volume Capacity, Na <sup>+</sup> Form (min.) (eq/L)	Mean Size Typical (µm)	Moisture Retention, Na <sup>+</sup> Form (%)	Moisture Retention, H <sup>+</sup> Form (%)	Remarks & Applications
<b>PCR145</b>	Macroporous Strong Acid Cation	1.5	280–320	55–60	60–66	Cation chromatographic separation resins can be supplied in Ca <sup>2+</sup> , Na <sup>+</sup> , K <sup>+</sup> or H <sup>+</sup> forms.  Ca <sup>2+</sup> form separations: glucose-fructose, maltose.  Na <sup>+</sup> form separations: beet molasses, dextrose enrichment, erythritol.  K <sup>+</sup> form separations: beet molasses, fructo-oligosaccharides, Soluble fiber.  H <sup>+</sup> form separations: acid-sugar (cellulose hydrolyzate).
<b>PCR450</b>	Gel Strong Acid Cation	1.35	360–400	60–65	65–71	
<b>PCR631</b>	Gel Strong Acid Cation	1.6	210–240	52–55	55–62	
<b>PCR632</b>	Gel Strong Acid Cation	1.6	210–250	52–55	55–61	
<b>PCR642</b>	Gel Strong Acid Cation	1.6	295–335	52–56	59–62	
<b>PCR651</b>	Gel Strong Acid Cation	1.6	330–370	52–56	59–62	
<b>PCR652</b>	Gel Strong Acid Cation	1.6	320–360	52–56	59–62	
<b>PCR732</b>	Gel Strong Acid Cation	1.8	210–250	50–52	53–57	
<b>PCR833</b>	Gel Strong Acid Cation	2.0	225–275	44–48	51–55	
<b>PCR855</b>	Gel Strong Acid Cation	2.05	210–230	42–46	48–53	

Product	Type	Mean Size Typical (µm)	Remarks & Applications
<b>SSTPCR642</b>	Gel Strong Acid Cation	300–340	Higher purity, higher recovery and lower elution water.
<b>SSTPCR732</b>	Gel Strong Acid Cation	200–240	Higher purity, higher recovery and lower elution water.

## Anion Separation Resins

Product	Type	Total Volume Capacity, (Cl <sup>-</sup> Form) (min.) (eq/L)	Mean Diameter (µm)	Moisture Retention, (Cl <sup>-</sup> Form) (%)	Remarks & Applications
<a href="#">PCA433</a>	Gel Strong Base Anion	1.3	150–350 (particle size range)	48–57	Anion chromatographic separation resin can be supplied in Cl <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , OH <sup>-</sup> forms.
<a href="#">A503MBOH/4363</a>	Macroporous Strong Base Anion	1.0	300–600 (particle size range)	61–66	Vitamin E purification.
<a href="#">A847DL</a>	Gel Weak Base Anion	1.6 (FB form)	300–630 (particle size range)	56–62 (FB form)	Used for citric and lactic acid purification.



Ecolab's chromatographic separation products are used in various sugar and sweetener applications including beet molasses desugarization.

# Adsorbents

Ecolab polymeric adsorbent resins are high-porosity synthetic spherical beads, typically used for the purification and extraction of target molecules in aqueous solutions. Ecolab adsorbents are safe and efficient because toxic solvents and expensive distillation and precipitation processes are not required for effective compound extraction. Also, unlike other adsorption technologies, additional benefit of recyclability is provided. For maximum adsorption, the polymeric adsorbent resins have high internal surface area, high porosity and controlled pore size distribution.

Ecolab has two families of adsorbents, PuroSorb™ (non-functionalized divinylbenzene and acrylic polymers and Macronet™ (hyper-crosslinked, functionalized and non-functionalized styrenic polymers). These product lines are offered in a broad range of matrices, porosities and pore sizes that make them ideal for a variety of industrial applications.

## PuroSorb Products

Product	Polymer Matrix	Typical Pore Diameter (Å)*	Typical Pore Volume (ml/g)*	Typical Surface Area (m <sup>2</sup> /dry g)*	Moisture Retention (%)	Remarks & Applications
<b>PUROSORB PAD400</b>	Polydivinylbenzene	360	1.0	700	47–55	Pharmaceutical processing, food processing, decolorization of beer broths, removal of sulfamethazines.
<b>PUROSORB PAD500</b>	Polydivinylbenzene	110	1.5	800	63–69	Anthocyanin recovery, patulin removal, antibiotic extraction.
<b>PUROSORB PAD600</b>	Polydivinylbenzene	90	1.3	850	56–64	Beta lactam & other small antibiotics, isolation and catechin extraction.
<b>PUROSORB PAD900</b>	Polydivinylbenzene	220	1.9	850	67–73	Polyphenol extraction, juice debittering, flavor extraction, pesticide removal, curcumin purification.
<b>PUROSORB PAD950</b>	Polymethacrylic	120	0.6	450	65–71	Juice debittering, anthocyanin extraction, removal of terpenes & carotenoids, curcumin purification.

\*By nitrogen adsorption

## Macronet Adsorbents

Product	Type	Volume Capacity (min.) (eq/L)	Typical Pore Diameter (Å)*	Typical Pore Volume (ml/g)*	Typical Surface Area (m <sup>2</sup> /dry g)*	Moisture Retention (%)	Remarks & Applications
<b>MACRONET MN100</b>	Weak Base Anion	0.1–0.3 (FB form)	650** 15***	0.4	1200	57–61 (Cl <sup>-</sup> form)	Functionalized with 0.1 to 0.2 meq per ml of weak base functionality for easy regeneration with caustic.
<b>MACRONET MN102</b>	Weak Base Anion	0.1–0.3 (FB form)	350** 15***	0.4	800	50–60 (FB form)	Decolorization & debittering of juices, beer and sweeteners, patulin removal.
<b>MACRONET MN200</b>	Inert	—	700** 15***	0.4	1,100	57–61	Adsorption of pyridine & phenols, removal of benzene & pesticide, VOC extraction.
<b>MACRONET MN202</b>	Inert	—	220** 15***	0.3	950	50–60	
<b>MACRONET MN502</b>	Strong Acid Cation	0.7–0.9 (H <sup>+</sup> form)	650** 15***	0.3	660	55–60 (H <sup>+</sup> form)	Sulfonated to 0.8 meq per ml giving them the dual functionality of a strong acid cation in the H <sup>+</sup> form. Taste & odor removal, pesticide removal.

\* By nitrogen adsorption  
 \*\* Meso/Macro/Transport Pores  
 \*\*\* Micropores



VOCs result from emissions from many industrial activities and contribute greatly to air pollution and harm to the ozone layer. Ecolab adsorbent resins are a very effective way to control VOC emissions from hexane and other VOCs without the problems of combustion and pore blocking that arise from other technologies.

Styrenic resins can be used for removing a broad range of VOC concentrations in various temperatures.

# Pharmaceutical Products

Ecolab pharmaceutical resins are used in drug formulations as Active Pharmaceutical Ingredients (APIs) or excipients. They meet the demands of the American (USP), European (Ph.Eur.), British (BP) and Japanese (JP) pharmacopoeias. Drug Master Files are held for each, single, listed pharmaceutical product manufactured in Ecolab's facilities.

All products are manufactured in our FDA-approved and cGMP-certified facilities.

## Active Pharmaceutical Ingredients

Product	Type	Description
<a href="#">C100MRNS</a>	Sodium Polystyrene Sulfonate	Strong acid cation exchange resin with Sulfonic groups. Used for the reduction of high Potassium levels in Hyperkalemia, topical microbicide and spermicide.
<a href="#">C100CaMRNS</a>	Calcium Polystyrene Sulfonate	
<a href="#">A430MR</a>	Cholestyramine	Strong base anion exchange resin in Chloride form. Acts as Bile Acid Sequestrant, used for the reduction of elevated serum Cholesterol in Hypercholesterolemia and for the relief of pruritus with Partial Biliary Obstruction.

## Excipients

Product	Type	Description
<a href="#">C100MRNS</a>	Polistirex (Sodium Polystyrene Sulfonate)	Strong acid cation exchange resin used for drug loading to control the release, taste masking and stability of APIs in oral dosage forms.
<a href="#">A430MR</a>	Cholestyramine	Strong base anion exchange resin for the loading and delivery of acidic formulations for controlled release, taste masking and stability of APIs in oral dosage forms.
<a href="#">C115HMR</a>	Polacrilex	Weak acid cation exchange resin in Hydrogen form. Used as a controlled release carrier or as pH adjuster in oral dosage forms. Also suitable for taste masking applications.
<a href="#">C115KMR</a>	Polacrilin Potassium	Weak acid cation exchange resin in Potassium form. Acts as disintegrant in tablets and orally disintegrating tablets. Also suitable for taste masking applications.

NOTE: Consult your local Ecolab office for confirmation of regional, country or state regulatory compliance. The manufacturing site is approved by the FDA and is cGMP certified.



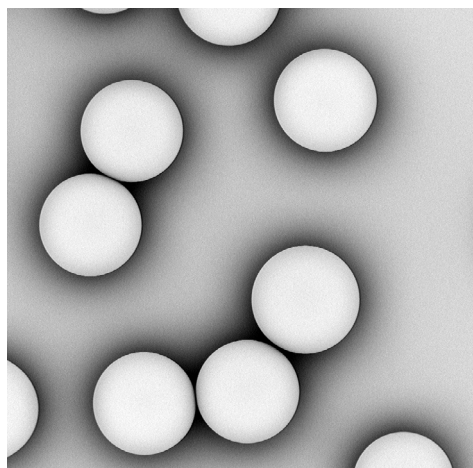
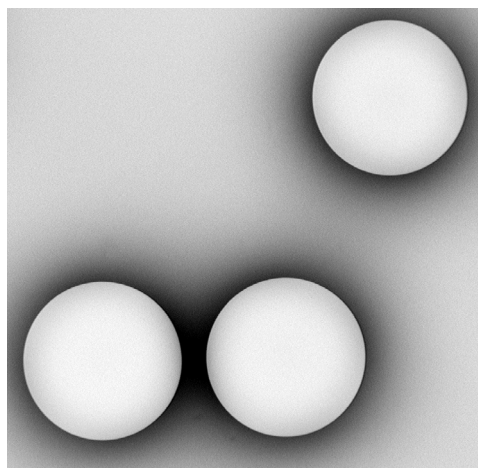
Ecolab pharmaceutical resins are used in drug formulations as Active Pharmaceutical Ingredients (APIs) or excipients.

# PuroMill™ Nanoparticle Milling Media

PuroMill advanced polymeric milling media reduces the particle size of compounds and molecules to the nanoscale, improving the overall characteristics of the formulation. The media is clean, safe and scalable to optimize milling processes, and is available in two purity grades, pharmaceutical and industrial.

PuroMill low density polymeric media significantly reduces contamination due to extractables, leachables and attrition, while curtailing the risk of hydraulic packing. Use for high-shear milling with conventional or novel equipment for creating nanoparticles.

Product	Type	Particle Size Range (µm)	Remarks & Applications
<b>PUROMILL PM3000</b>	Gel Polystyrene	250–350	Inert copolymer, pharmaceutical grade. Applications include nanoparticle milling, preparation of ultra-fine nanoparticles, biological cell disruption, improve solubility of small molecules.
<b>PUROMILL PM5000</b>	Gel Polystyrene	450–550	
<b>PUROMILL PM7000</b>	Gel Polystyrene	650–750	



The smooth, non-porous, non-adsorptive micro surface of PuroMill minimizes contamination while the highly consistent, monodisperse particle size prevents screen binding and ensures reproducible milling performance.

# Catalyst Products

Ecolab manufacturers advanced polymeric resin catalysts for the petrochemical industry. Faster process times, better yields, and higher product purity may be obtained by using a properly designed and purified catalyst. Ecolab polymeric catalyst resins are supplied either completely water-swollen or dried to specification. When selecting a catalyst resin, consideration factors include process parameters and requirements, catalyst type, dry weight capacity, porosity and swelling/shrinkage properties.

Product	Type	Functional Group	Ionic Form	Total Capacity, H <sup>+</sup> Form (min.) (eq/dry kg)*	Moisture Retention, H <sup>+</sup> Form (%)	Remarks & Applications
<b>CT124</b>	Gel	Sulfonic	H <sup>+</sup>	5.0	60–65	Recommended for esterification reactions and for the synthesis of Bisphenol A.
<b>CT151</b>	Macroporous	Sulfonic	H <sup>+</sup>	5.1	54–59	Specifically designed for catalysis of organic reactions, in particular for the purification of phenol.
<b>CT169</b>	Macroporous	Sulfonic	H <sup>+</sup>	4.7	51–57	MTBE, ETBE, TAME, TAE, esterification, C4 dimerization.
<b>CT175</b>	Macroporous	Sulfonic	H <sup>+</sup>	4.9	53–58	Excellent accessibility of active sites. Studied and developed for the synthesis of MTBE, ETBE, TAME and TAE.
<b>CT251</b>	Macroporous	Sulfonic	H <sup>+</sup>	5.2	54–59	Primarily used for phenol purification, esterification, C4 dimerization.
<b>CT252</b>	Macroporous	Sulfonic	H <sup>+</sup>	5.4	54–58	Primarily used for phenol purification, etherification and aromatic alkylation.
<b>CT269</b>	Macroporous	Sulfonic	H <sup>+</sup>	5.2	51–57	High activity with very good mechanical resistance. Ideal for esterification reactions and phenol alkylation.
<b>CT275</b>	Macroporous	Sulfonic	H <sup>+</sup>	5.2	54–59	High activity catalyst with excellent accessibility of active sites. Recommended for the synthesis of MTBE, ETBE, TAME and TAE.

NOTE: Most products are also available in DR (Dry) grade.  
\*Capacity expressed in dry weight capacity in eq/kg.



Ecolab catalyst resins are used in the petrochemical industry for numerous applications including the synthesis of MTBE.

# Inert Spacer Polymers

Product	Type	Specific Gravity	Particle Size Or Dimension (mm)	Remarks & Applications
IP1	Polyethylene	0.91–0.95	2.5–4.0	Floating inert polymer for Puropack systems with downflow service in droplets form.
IP3	Polyacrylate	1.12–1.16	0.63–0.85	White colored inert spacer for use in Trilite 3-component mixed beds.
IP4	Polypropylene	0.8–0.9	0.8–1.6	Floating inert polymer in the form of small cylinders for Puropack systems with upflow service.
IP7	Polyacrylate	1.12–1.16	0.63–0.85	Blue colored inert spacer for use in Trilite 3-component mixed beds.
IP9	HDPVC	1.3 (min.)	2–5.5	High density inert polymer for use as an underbed.

# Special Products

Product	Type	Functional Group	Ionic Form	Total Capacity (min.) (eq/L)	Moisture Retention (%)	Remarks & Applications
A501P	Type I Macroporous Polystyrenic	Quaternary Ammonium	Cl <sup>-</sup>	0.5	70–75	Specifically designed for the adsorption of colloidal particulate (silica, organic matter, metals, clays, etc.).
C150Ag	Macroporous Strong Acid Cation	Sulfonic	Na <sup>+</sup> /Ag <sup>+</sup>	1.8	48–53	Silver loaded resin used as bacteriostatic additive for softening resins.
HM10	Hydroponic Resin	Sulfonic/Tertiary Amine	H <sup>+</sup> /Free Base / Nutrients	—	—	For nutrient release for healthy growth and development of ornamental plants in hydroculture.
WCA100	Gel Weak Acid/Strong Base	Carboxylic Acid/Quaternary Ammonium	Self-Neutralized Internal Salt	0.8	48–57	Amphoteric resin containing balance of weakly acidic and strongly basic groups. Chromatographic applications like salt removal from caustic and sulfate removal from brine.

## Special Products (Cont'd)

Product	Type	Functional Group	Ionic Form	Total Capacity (min.) (eq/L)	Moisture Retention (%)	Remarks & Applications
<b>CT275Ag</b>	Macroporous Strong Acid Cation	Sulfonic	H <sup>+</sup> /Ag <sup>+</sup>	5.2 eq/kg (H <sup>+</sup> form)	54–59 (H <sup>+</sup> form)	Silver loaded resin for the removal of alkyl iodides (C <sub>1</sub> to C <sub>12</sub> or higher) in organic solvents such as acetic acid, under low temperature conditions (< 50°C) and/or high flow rate.
<b>PD206</b>	Gel Strong Acid Cation	Sulfonic	H <sup>+</sup>	4.9 eq/kg (H <sup>+</sup> form)	–	Premium dry resin with optimized residual moisture for biodiesel purification for removal of glycerin, water and residual cations. Helps to produce biodiesel to international recognized standards.
<b>OL100</b>	Gel Strong Acid Cation	Sulfonic	Na <sup>+</sup>	2.0 (Na <sup>+</sup> form)	44–48 (Na <sup>+</sup> form)	Specially activated resin for oil separation from water by coalescence. Primary application in deoiling of condensates.



Ecolab inert spacer polymers are used to create a barrier in an ion exchange bed and keep the ion exchange beads exactly where they are supposed to be.

## Abbreviations

API Active Pharmaceutical Ingredient

---

BOD Biological Oxygen Demand

---

BP British Pharmacopoeias

---

BWR Boiling Water Reactor

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cGMP Current Goods Manufacturing Practice

---

COD Chemical Oxygen Demand

---

CVCS Chemical and Volume Control System

---

DR Dry

---

EDM Electrical Discharge Machining

---

EDTA Ethylenediaminetetraacetic Acid

---

ETBE Ethyl Tert-Butyl Ether

---

FB Free Base

---

FDA Food and Drug Administration

---

GMP Good Manufacturing Practice

---

HMF Hydroxymethylfurfural

---

IEX Ion Exchange

---

ISL In Situ Leaching

---

ISO International Organization for Standardization

---

IWT Industrial Water Treatment

---

JP Japanese Pharmacopoeias

---

MB Mixed Bed

---

MTBE Methyl Tert-Butyl Ether

---

ND Non-Detectable

---

NOM Natural Organic Matter

---

NRW Nuclear Grade

---

NSF National Science Foundation

---

OSA Osmotic Shock and Attrition

---

PCR Chromatographic Separation Resins

---

PFA Purofine™ Anion

---

PFAS Poly-and Perfluoroakyl Substances

---

PFC Purofine™ Cation

---

pH Potential of Hydrogen

---

POE Point of Entry

---

POU Point of Use

---

PPA Puropack™ Anion

---

PPC Puropack™ Cation

---

RIP Resin in Pulp

---

RO Reverse Osmosis

---

SAC Strong Acid Cation

---

SBA Strong Base Anion

---

SDI Silt Density Index

---

SST Shallow Shell™ Technology

---

STD Standard

---

TAEE Tert-Amyl Ethyl Ether

---

TAME Tert-Amyl Methyl Ether

---

TDS Total Dissolved Solids

---

TOC Total Organic Carbon

---

UPW Ultrapure Water

---

USP U.S. Pharmacopoeia

---

VOC Volatile Organic Compound

---

WAC Weak Acid Cation

---

WBA Weak Base Anion

---

XLC Extra Low Chloride

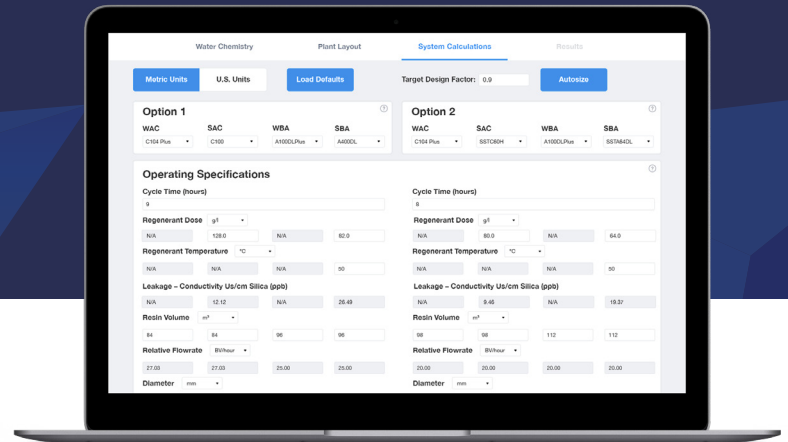
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# Customized Resin Simulation at Your Fingertips



**PRSM™**  
Purolite Resin System Modeling

PRSM is a free program that models all aspects of plant design associated with ion exchange resin performance and operation.



Plan your next ion exchange resin project with better accuracy and less effort using the Purolite Resin System Modeling (PRSM™) platform. This powerful web application for resin plant simulation contains seven specific system modules that instantly consider hundreds of variables. Whether you are designing a new plant or modeling an existing plant, our expert engineers are giving you the access you need to get the results you can trust.

## Key Insight Every Step of the Way



### Predict

Calculate the effect of your site's unique variables



### Compare

Side-by-side product and plant configuration performance evaluation



### Optimize

Add operation and product cost analysis to better understand the value of product options

PRSM includes modules for water softening, demineralization, WAC softening, brine purification, mixed beds and modules for removal of nitrate, arsenic and boron. Features include:

**Technical Help** – Reach out directly to our engineers for advice

**Cloud Backup** – Easy and secure retrieval of projects

**Reporting** – Print/save a pdf of the entire design including all engineering details

**ROI Payback Calculations** – Contrast performance vs. standard resins

**Efficiency Evaluation** – Compare operating costs of existing ion exchange plant vs. new design

**Schedules** – Obtain detailed regenerant schedules for cation and anion resins

**Page, Topic and Calculation Help** – View detailed notes and suggestions for the optimal design



Register today and get started at [www.puroliteresins.com/PRSM](http://www.puroliteresins.com/PRSM)

Ecolab is a global developer, manufacturer, and supplier of Purolite™ Resins including ion exchange, catalyst adsorbent and advanced polymers that make the world cleaner and healthier.



[PuroliteResins.com](https://PuroliteResins.com)



## We're ready to solve your process challenges.

For further information on products and services, visit [PuroliteResins.com](https://PuroliteResins.com) or complete a Contact Us form via [PuroliteResins.com/contact-us](https://PuroliteResins.com/contact-us) or use the QR code.

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