AMBERSEP™ 21K Ion Exchange Resins
Industrial-grade, Strong Base Anion Exchange Resins for Mineral Processing Applications

Description
AMBERSEP™ 21K Ion Exchange Resins are Type I strong base anion resins with excellent kinetics and regeneration efficiency, along with outstanding physical stability. Both are especially suited for mineral processing and groundwater remediation applications due to their enhanced-porosity gel bead matrix made by a special process giving fast equilibrium rates and improved resistance to organics.

AMBERSEP™ 21K XLT Ion Exchange Resin, with its high capacity and uniform particle size, represents the state-of-the-art solution for mineral processing, giving enhanced performance for packed bed systems.

AMBERSEP™ 21K 16-20 Ion Exchange Resin, with its screened particle size from 16 – 20 U.S. Mesh, is a high-efficiency, large-bead resin suitable for fluidized-bed and Resin-In-Pulp (RIP) applications.

Applications
- Mineral Processing (Zn, Mn, etc.)
- Precious metal recovery (Au, Ag, Pt, Pd, Rh)
- Uranium recovery
**Typical Properties**

**Physical Properties**
- Copolymer: Styrene-divinylbenzene
- Matrix: Gel
- Type: Strong base anion, Type I
- Functional Group: Quaternary amine
- Physical Form: White to tan, translucent, spherical beads

**Chemical Properties**
- Ionic Form as Shipped: Cl\(^-\) Cl\(^-\)
- Total Exchange Capacity: ≥ 1.4 eq/L ≥ 1.2 eq/L
- Water Retention Capacity: 50 – 60% 50 – 58%

**Particle Size**
- Particle Diameter: 575 ± 50 µm 800 – 1300 µm
- Uniformity Coefficient: ≤ 1.1 ≤ 10%
- < 840 µm: ≤ 2%
- < 710 µm: ≤ 2%

**Stability**
- Whole Uncracked Beads: ≥ 95% ≥ 90%
- Swelling: Cl\(^-\) → OH\(^-\): 18 – 20% Cl\(^-\) → OH\(^-\): 20%

**Density**
- Particle Density: 1.08 g/mL 1.08 g/mL
- Shipping Weight: 670 g/L 690 g/L

**Suggested Operating Conditions**

**Maximum Operating Temperature**
- OH\(^-\) form: 60°C (140°F)
- Cl\(^-\) form: 100°C (212°F)

**pH Range**: 0 – 14

**Bed Depth, min.**: 800 mm (2.6 ft)

**Organic Loading**: ≤ 3 g KMnO\(_4\)/L resin

**Flowrates**
- Service: 5 – 60 m/h (2 – 24 gpm/ft\(^2\)) 5 – 50 m/h (2 – 20 gpm/ft\(^2\))
- Backwash: See Figure 1 See Figure 1

**Regeneration Chemical Injection**
- Co-current: 1 – 10 m/h (0.4 – 4 gpm/ft\(^2\)) 1 – 10 m/h (0.4 – 4 gpm/ft\(^2\))
- Counter-current: 5 – 20 m/h (2 – 8 gpm/ft\(^2\))

**Displacement Rinse**
- Co-current: 1 – 10 m/h (0.4 – 4 gpm/ft\(^2\)) 1 – 10 m/h (0.4 – 4 gpm/ft\(^2\))
- Counter-current: 5 – 20 m/h (2 – 8 gpm/ft\(^2\))

**Fast Rinse**: 5 – 60 m/h (2 – 24 gpm/ft\(^2\)) 5 – 50 m/h (2 – 20 gpm/ft\(^2\))

**Total Rinse Requirement**: 3 – 6 BV* 3 – 6 BV*

**Regenerant**: NaCl, Na\(_2\)CO\(_3\), NaOH

**Temperature**: Ambient or up to 50°C (122°F) for silica removal

* 1 BV (Bed Volume) = 1 m\(^3\) solution per m\(^3\) resin or 7.5 gal per ft\(^2\) resin
Hydraulic Characteristics

Bed expansion of AMBERSEP™ 21K XLT and AMBERSEP™ 21K 16-20 Ion Exchange Resins as a function of backwash flowrate at 25°C (77°F) is shown in Figure 1.

Pressure drop data for AMBERSEP™ 21K XLT and AMBERSEP™ 21K 16-20 as a function of service flowrate at 25°C (77°F) is shown in Figure 2. Pressure drop data are valid at the start of the service run with clean water.

Product Stewardship

DuPont has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with DuPont products—from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

DuPont strongly encourages its customers to review both their manufacturing processes and their applications of DuPont products from the standpoint of human health and environmental quality to ensure that DuPont products are not used in ways for which they are not intended or tested. DuPont personnel are available to answer your questions and to provide reasonable technical support. DuPont product literature, including safety data sheets, should be consulted prior to use of DuPont products. Current safety data sheets are available from DuPont.

Please be aware of the following:

- **WARNING:** Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

---

Figure 1: Backwash Expansion
Temperature = 25°C (77°F)

Figure 2: Pressure Drop
Temperature = 25°C (77°F)
Have a question? Contact us at:
www.dupont.com/water/contact-us

All information set forth herein is for informational purposes only. This information is general information and may differ from that based on actual conditions. Customer is responsible for determining whether products and the information in this document are appropriate for Customer’s use and for ensuring that Customer’s workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where DuPont is represented. The claims made may not have been approved for use in all countries. Please note that physical properties may vary depending on certain conditions and while operating conditions stated in this document are intended to lengthen product lifespan and/or improve product performance, it will ultimately depend on actual circumstances and is in no event a guarantee of achieving any specific results. DuPont assumes no obligation or liability for the information in this document. References to “DuPont” or the “Company” mean the DuPont legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. No freedom from infringement of any patent or trademark owned by DuPont or others is to be inferred.

DuPont™, the DuPont Oval Logo, and all trademarks and service marks denoted with™, ℠ or ® are owned by affiliates of DuPont de Nemours Inc. unless otherwise noted. © 2019 DuPont.