

**Product Data Sheet** 

# AmberSep<sup>™</sup> IRA743 Chelating Resin Industrial-grade Chelating Resin for Selective Boron Removal

The presence of boron compounds, even in very small concentration, is frequently a concern in drinking and irrigation water, in ultrapure water (as used in the semiconductor industry), and in other chemical processes.         Boric acid can be removed from water with conventional ion exchange resins, but the exchange is not selective and, therefore, impractical. The selectivity of AmberSep™ IRA743 for boric acid is high, even in saline backgrounds.         The high selectivity of AmberSep™ IRA743 for boric acid is due to a unique, sugar-like active group. The borate ion makes a very stable complex with the glucamine group, while other anions do not react at all.         Applications       • Irrigation water         • Ultrapure water       • Ultrapure water         • Wastewater for fossil power plants       • Purification of magnesium brine         • Purification of magnesium brine       • Purification of lithium brines         • Produced water       • Copolymer         Type       Chelant         Functional Forup       • Marix         Matrix       • Macroporous         Type       Chelant         Functional Forup       • Preve base (FB)         Total Exchange Capacity       > 0.0 eq/L         • Water Relention Capacity       > 0.0 - 700 µm         • Uniformity Coefficient       ≤ 1.8         • 1100 µm       ≤ 5%         • 1200 µm       ≤ 1.16         • 100 µm       ≤ 1.5%	Description	AmberSep <sup>™</sup> IRA743 Chelating Resin is a unique ion exchange resin specifically designed and used to remove boric acid and borate from water, magnesium brine, or other solutions under a variety of conditions.	
exchange is not selective and, therefore, impractical. The selectivity of AmberSep™ IRA743 for boric acid is high, even in saline backgrounds.         The high selectivity of AmberSep™ IRA743 for boric acid is due to a unique, sugar-like active group. The borate ion makes a very stable complex with the glucamine group, while other anions do not react at all. <b>Applications</b> • Irrigation water • Ultrapure water • Uutrapure water • Purification of magnesium brine • Purification of magnesium brine • Purification of lithium brines • Produced water <b>Typical Properties</b> Copolymer Matrix Functional Group Physical Forperties       Styrene-divinylbenzene Matrix • Macroporous Type         Chelant Functional Group Physical Forperties       N-methylglucamine • Physical Properties • Denticel State • Protace Styrene-divinylbenzene • Matrix • Purification Group • Physical Properties • Protace Styrene-divinylbenzene • Matrix • Protace Styrene-divinylbenzene • Matrix • Protace Styrene-divinylbenzene • Matrix • Purification a Group • Physical Form • Physical Properties • Pratice State • Protace Styrene-divinylbenzene • Physical Form • Off-white, opaque, spherical beads         Chemical Properties • Innic Form as Shipped • Tate Exchange Capacity • 20.6 eq/L • Water Retention Capacity • 48 - 54%         Particle State \$ • Particle State \$ • Particle State \$ • Stop = 700 µm • Uniformity Coefficient • 1180 µm • 51%		concern in drinking and irrigation water, in ultrapure water (as used in the	
active group. The borate ion makes a very stable complex with the glucamine group, while other anions do not react at all.         Applications <ul> <li>Irrigation water</li> <li>Ultrapure water</li> <li>Wastewater for fossil power plants</li> <li>Purification of magnesium brine</li> <li>Purification of lithium brines</li> <li>Produced water</li> </ul> Typical Properties <ul> <li>Copolymer</li> <li>Styrene-divinylbenzene</li> <li>Matrix</li> <li>Macroporous</li> <li>Type</li> <li>Chelant</li> <li>Functional Group</li> <li>N-methylglucamine</li> <li>Physical From</li> <li>Off-white, opaque, spherical beads</li> </ul> Chemical Properties           Ionic Form as Shipped         Free base (FB)           Total Exchange Capacity <ul> <li>0.6 eq/L</li> <li>Water Retention Capacity</li> <li>4.8 - 54%</li> <li>Particle Diameter</li> <li>500 – 700 µm</li> <li>Uniformity Coefficient</li> <li>1.6</li> <li>300 µm</li> <li>1180 µm</li> <li>5%</li> </ul>		exchange is not selective and, therefore, impractical. The selectivity of	
<ul> <li>Ultrapure water</li> <li>Wastewater for fossil power plants</li> <li>Purification of magnesium brine</li> <li>Purification of lithium brines</li> <li>Produced water</li> </ul> Typical Properties           Copolymer         Styrene-divinylbenzene           Matrix         Macroporous           Type         Chelant           Functional Group         N-methylglucamine           Physical Properties         Off-white, opaque, spherical beads           Chemical Properties         Ionic Form as Shipped           Ionic Form as Shipped         Free base (FB)           Total Exchange Capacity         ≥ 0.6 eq/L           Water Retention Capacity         ≤ 0.6 eq/L           Water Retention Capacity         ≤ 0.6 eq/L           Water Retention Capacity         ≤ 1.6           < 300 µm         ≤ 1%           > 1180 µm         ≤ 5%		active group. The borate ion makes a very stable complex with the glucamine group,	
CopolymerStyrene-divinylbenzeneMatrixMacroporousTypeChelantFunctional GroupN-methylglucaminePhysical FormOff-white, opaque, spherical beadsChemical PropertiesIonic Form as ShippedFree base (FB)Total Exchange Capacity≥ 0.6 eq/LWater Retention Capacity48 – 54%Particle Size <sup>§</sup> Particle Diameter500 – 700 μmUniformity Coefficient≤ 1.6< 300 μm≤ 1%> 1180 μm≤ 5%Density	Applications	<ul> <li>Ultrapure water</li> <li>Wastewater for fossil power plants</li> <li>Purification of magnesium brine</li> <li>Purification of lithium brines</li> </ul>	
Ionic Form as ShippedFree base (FB)Total Exchange Capacity≥ 0.6 eq/LWater Retention Capacity48 – 54%Particle Size §Particle Diameter500 – 700 μmUniformity Coefficient≤ 1.6< 300 μm≤ 1%> 1180 μm≤ 5%Density	Typical Properties	Copolymer Matrix Type Functional Group Physical Form	Macroporous Chelant N-methylglucamine
Particle Diameter       500 – 700 μm         Uniformity Coefficient       ≤ 1.6         < 300 μm       ≤ 1%         > 1180 μm       ≤ 5%		lonic Form as Shipped Total Exchange Capacity	≥ 0.6 eq/L
•		Particle Diameter Uniformity Coefficient < 300 μm > 1180 μm	≤ 1.6 ≤ 1%
		•	700 g/L

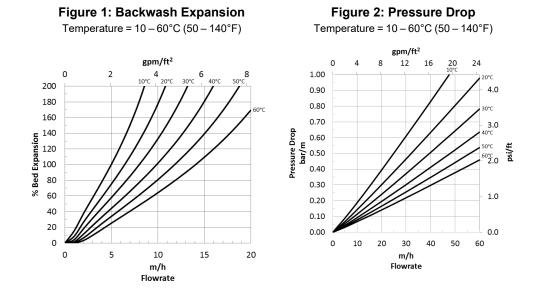
<sup>§</sup> For additional particle size information, please refer to the Particle Size Distribution Cross Reference Chart (Form No. 45-D00954-en).

Suggested Operating Conditions	Maximum Operating Temperature Service Flowrate	75°C (167°F) 4 – 30 BV*/h
	Regeneration	Several regeneration procedures are available, depending on the application
	* 1 BV (Bed Volume) = 1 m <sup>3</sup> solution pe	* 1 BV (Bed Volume) = 1 m <sup>3</sup> solution per m <sup>3</sup> resin or 7.5 gal per ft <sup>3</sup> resin

## Hydraulic Characteristics

Bed expansion of AmberSep<sup>™</sup> IRA743 Chelating Resin as a function of backwash flowrate and water temperature is shown in Figure 1.

Pressure drop data for AmberSep<sup>™</sup> IRA743 in water as a function of service flowrate and water temperature is shown in Figure 2. Pressure drop data are valid for clean, classified beds which have not been contaminated with suspended solids during the service run; if the bed accumulates solids, the pressure drop will increase.



# Application Information

### **Irrigation Water**

Boron is known to improve plant growth, but within tight limits—excess boron has a very detrimental effect on agriculture. The boron limit is usually considered to be 1 mg/L.

### **Ultrapure Water**

Boron is used as a doping agent in the production of semiconductors. Therefore, wastewater in this industry contains variable amounts of boron. However, boron must be totally absent from the water used in certain production steps. AmberSep<sup>™</sup> IRA743 Chelating Resin can reduce boron concentrations to ng/L (parts per trillion) levels.

#### Wastewater

Boron is present in ceramic tiles and enamels used to decorate them. These boron compounds can be selectively removed from the waste streams using AmberSep™ IRA743 Chelating Resin.

### **Magnesium Brine**

Magnesium is produced by electrolysis. The presence of boron prevents the coalescence of magnesium during the electrolysis of fused Mg salts. The brines must be purified, bringing the B concentration from about 100 mg/L to less than 10 mg/L, which can be accomplished with AmberSep<sup>™</sup> IRA743 Chelating Resin, even in a solution with extremely high salt background.

Application Information (Cont.)	<ul> <li>Produced Water</li> <li>When treating produced water for reuse for gel fracking operations, boron removal is typically required. Boron can lead to premature crosslink of the polymers in fracking fluids, upsetting the delayed rheology desired in the gel formulation. For this reason, a boron selective ion exchange resin like AmberSep™ IRA743 Chelating Resin can be used to efficiently reduce boron concentrations without impairing gel fracking formulations.</li> <li>Drinking Water</li> <li>AmberSep™ IRA743 Chelating Resin is intended only for industrial purposes. For boron removal from drinking water, the use of AmberLite™ PWA10 Ion Exchange Resin is recommended.</li> <li>The above applications are examples, and each of them requires a specific regeneration procedure. Potential users should contact a technical service representative for more details.</li> </ul>
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.
	<ul> <li>Please be aware of the following:</li> <li>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.</li> </ul>
Regulatory Note	These products may be subject to irrigation water / drinking water application restrictions in some countries; please check the application status before use and sale.

#### 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.

© 2023 DuPont. DuPont<sup>™</sup>, the DuPont Oval Logo, and all trademarks and service marks denoted with <sup>™</sup>, <sup>sM</sup> or <sup>®</sup> are owned by affiliates of DuPont de Nemours Inc., unless otherwise noted.

