

E-Cell* EDI and Ionics* ED/EDR/BPED

CAPABILITY PROFILE

Comparing markets and applications of electro dialysis and electrodeionization

Veolia Water Technologies has a wide offering of membrane separation technologies in its product portfolio. Among them are a set of technologies that utilize electrical energy to pull ions through ion-selective membranes, leaving valuable clean water or process solutions behind. This contrasts with the more commonly used ultrafiltration, nanofiltration, and reverse osmosis technologies that use hydraulic pressure to push water through a size-selective semi-

permeable membrane. Veolia's Ionics brand is derived from a long history in electro dialysis (ED), electro dialysis reversal (EDR), and bipolar electro dialysis (BPED) and references Ionics Inc, the original inventor of ion exchange membranes. The E-Cell brand represents Veolia's electrodeionization (EDI) technology and connects Veolia to E-Cell Corporation, a pioneer in the growth of EDI.

	Ionics – Founded 1948			E-Cell – Founded 1995
	Ionics Electrodialysis (ED) Stacks & Systems	Ionics Electrodialysis Reversal (EDR) Stacks & Systems	Ionics Bipolar Electrodialysis (BPED) Stacks & Systems	E-Cell Electrodeionization (EDI) Stacks & Systems
What Does It Do?	Value Added Demineralization of Food & Process Fluids	Desalination and Demineralization of Brackish Water and Wastewater	Acid/Base Production from Brine or pH Adjustment of Process Fluids	Continuous Deionization and Polishing of RO Permeate for Removal of Residual Salts and Ionizable Species
Competing Technology?	Ion Exchange, Evaporation, Distillation	Brackish Water Reverse Osmosis	Electrolysis	Ion Exchange (Polishing Mixed Bed)
Examples of Where and How It Can Be Used?	<u>Food & Beverage:</u> Enhancement of Whey, Sugar/Sweeteners, Wine, Fruit Juice, Hydrolyzed Protein <u>Chemicals:</u> Recovery of Glycerine, Glycol, and Amines	<u>Municipal:</u> Drinking Water, Wastewater Reuse for Irrigation <u>Industrial:</u> Reuse of RO Reject, High Silica and/or High Organics Wastewater in Microelectronics, Oil & Gas, Mining, Power, and Other Industries	<u>Municipal & Industrial:</u> Brine (Wastewater) Resource Recovery <u>Food & Beverage:</u> pH Adjustment of Juice and Wine	<u>Electronics, Microelectronics, Semiconductors:</u> Ultrapure Water <u>Industrial (Power, Steel, Chemicals, etc.):</u> Boiler and Turbine Feed Water, NOx Control <u>Pharmaceuticals:</u> Water for Injection Purified Water

Veolia Water Technologies
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