

electrodialysis demineralization of whey

technology

Electrodialysis (ED) uses electrical power to move ionized salts through ion exchange membranes, while leaving other components behind (Figure 1).

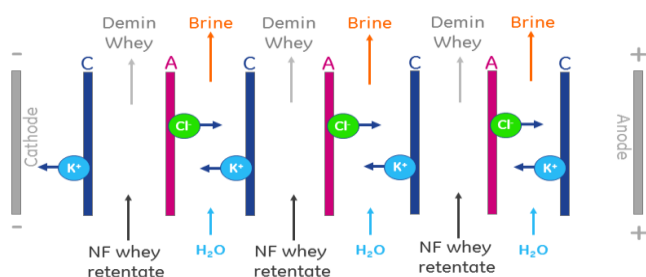


Figure 1: ED process



Figure 2: SUEZ's ED Systems

SUEZ in dairy industry

SUEZ is a world leader in membrane technology for the dairy industry, supplying ED, Nanofiltration (NF), Ultrafiltration (UF), and Reverse Osmosis (RO) membranes and systems.

Our ED systems draw from over 50 years of design and support experience in the whey demineralization industry.

SUEZ's strength is in providing superior membrane products along with the expertise to utilize them to maximize the output and quality of our customers' products.

continuous ED process

SUEZ developed the first continuous electrodialysis process for demineralization of whey and continues to improve this technology which replaces outdated and less sanitary batch operation. The durable, high-temperature stability of our homogeneous membranes allows for higher electrical efficiency and ion transfer during operation.

Our patented counter current brine process also enhances salt transfer allowing 90% demineralization of whey to be achieved via continuous operation.

food contact certification

SUEZ's ELECTROMAT* ED Systems have been utilized as part of an FDA approved and USDA inspected manufacturing process for infant formula since 1961.

Find a contact near you by visiting www.suezwatertechnologies.com and clicking on "Contact Us."

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SUEZ's ED membranes for dairy applications are compliant with Regulation (EC) 1935/2004 regarding materials and objects destined to come into contact with foodstuffs.

sanitary operation

SUEZ ED systems are designed to sanitary standards, and sanitary conditions within the stacks are maintained with scheduled maintenance, inspection and cleaning, as specified by the USDA for plate-and-frame type equipment. Electrodialysis does not contribute significantly to microbial growth at any temperature of operation.

No instances of product failure due to microbial issues have not been attributed to SUEZ's ED systems in decades of ED demineralized whey operation.

low ash D90 product

There are a number of specifications for D90 whey purchased on the global market. Some are crafted specifically for ED only product and some were developed based on use of ion exchange to polish ED product or on its own. Table 1 details the specifications for D90 Whey by technology type.

Table 1: Specifications of D90 Whey

Component	EDW 90	IEX 90	Low-ash EDW 90
Protein %	13 (12.0 min)	12.5 (11.0 min)	13.0 (12.0 min)
Fat %	1.0 (1.5 max)	1.0 (1.25 max)	1.0 (1.5 max)
Lactose %	82 min	82.5 typical	82 min
Total Ash %	1.2 (1.5 max)	0.8 (1.0 max)	0.95 (1.0 max)
Ca, mg/100 g	135 to 220	40 to 80	125
Mg, mg/100g	65 to 85	10 to 30	50
K, mg/100g	300 to 450	100 to 400	300
Na, mg/100g	10 to 40	50 to 120	20
Cl, mg/100g	5 to 25	20 to 60	20
P, mg/100g	150 to 220	80 to 180	150
Nitrates mg/kg	25	20 to 50	25
Nitrites mg/kg	1	0.5	1

SUEZ's latest continuous ED systems for whey demineralization are now able to produce D90 demineralized whey that closely matches specifications for IEX90 demineralized whey.

The benefits of this include:

- Higher level of remaining "milk minerals" such as calcium and magnesium that are often added back into demineralized whey since they are beneficial in infant formula.
- Lower protein loss than with ion exchange. Electrodialysis does not alter the pH of the whey significantly, meaning less denaturing of proteins.
- Lower overall losses and less dilution of product, since there is no "sweetening off" process required.

modular system designs

SUEZ ELECTROMAT ED Systems are built based on a standardized set of modular platforms. The number of stages in the system determines the level of demineralization, while the number of stacks per stage determines the volume to be produced. Our standard platforms include the ELECTROMAT Nx1, Nx2 and Nx4, where N is the number of stages, and the second number shows the number of stacks per stage.

The modular design of the system allows for easy expansion. The number of cells in each stack is also flexible due to our easy-to-open stack design.

Our systems are designed for simple fully controlled operation of process, flush, and CIP.

InSight* remote monitoring

InSight, SUEZ's cloud-based knowledge management platform, provides the means to capture, and translate data into valuable information. Ultimately providing the knowledge you need to get the most out of your operation that support production assets, at the lowest total cost of operation. InSight provides:

Analytics: Seeing, at any point in time, the historical and current performance against success criteria.

Early Detection: Detecting emerging problems, so that action can be taken now to correct them.

Asset Optimization: Identifying opportunities to optimize the total cost of operations, without sacrificing production performance.

Collaboration: InSight enables customers to choose the way they manage information with a wide range of functionality.