



Low Waste Ion Exchange

DOWEX™ UPCORE™ Packed Bed System



Low Waste, High Efficiency, High Rate Ion Exchange System for the Removal of Dissolved Ionic Contaminants

Ion exchange is a highly effective process for the removal of dissolved ionic contaminants such as radium or nitrate, or excessive hardness or alkalinity. Developed in cooperation with Dow Chemical Company, Layne's system optimizes the ion exchange process, thus reducing waste products and chemical consumption.

Sized and scaled for municipal applications, Layne's system is designed to minimize waste production and maximize salt utilization. Selected portions of the regeneration stream are diverted from discharge to waste and reserved for reuse in future regeneration cycles. Total waste production is typically less than 1% of total production, often less than 0.5%.

High Flow Rates With Low Waste

Systems achieve high flow-rates and low waste. Flow passages are designed for equidistant distribution points from the distributor to the media bed, resulting in equalized pressure drop for all pathways. An advantage of this design is that pressure drop and exit velocity are very low. Equalized distribution at this low velocity produces a plug flow condition in the media bed.

Backmixing is eliminated, and regeneration streams pass through the bed in well defined wavefronts, allowing clean separation of the fractions to be recycled. This also assures that the resin capacity is efficiently utilized both in treatment and in regeneration.

Advantages of Layne's System

Conventional ion exchange systems typically operate at surface loadings of only 6-9 gpm/sq. ft. Layne's Low Waste System is engineered for loading rates up to 22 gpm/sq. ft. This enhancement enables vessels to be significantly smaller, saving on installation floor space. Vessel height is minimized, saving overhead space requirements. Vessels are available in multiple diameters.

*Lowest overall capital cost,
operating cost and cost of
ownership*

- Superior loading, rates up to 22 gpm/sq. ft. (>250% improvement compared to conventional systems)
- High efficiency design
- Low waste through selective brine reuse
- Small equipment footprint and low height requirements
- Modular treatment train provides scalability
- Reduced time and cost for field installation
- Reduced regenerant costs
- Fully automated design, standard

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www.laynechristensen.com

Layne Christensen Company

*Experienced
Equipped
Committed*



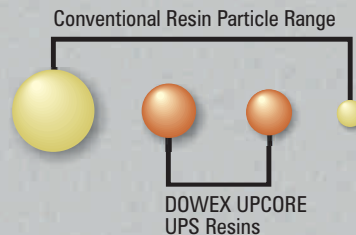
Reduce Costs and Improve Water Quality

Whether you need to install a Layne system for a new or existing plant, Layne offers a way to reduce your costs by as much as 50 percent while also improving water quality. Layne designs, fabricates, installs, services and trains for DOWEX™ UPCORE™ systems and media. The systems combine upflow, countercurrent regeneration technology with uniform particle size resins to achieve higher water quality, more efficient regeneration and greater operating capacity.

Because the DOWEX UPCORE system is an upflow regeneration system with downflow service, the packed resin bed is less vulnerable to fluctuations in water flow during the system cycle.

How Uniform Particle Size Improves Performance

DOWEX UPCORE ion exchange resins are available with uniform particle size (UPS), which contributes significantly to system performance and economics. While conventional or Gaussian distribution resin beads range in size from 300 to 1200 microns, UPS resins have a much narrower particle size distribution, with 95 percent of the beads within 100 microns of the average particle diameter.



Regeneration is faster and more efficient with UPS resins, reducing chemical and rinse requirements.

With the DOWEX UPCORE system, you can gain a number of benefits over traditional co-current and counter-current regeneration systems:

- Excellent water quality
- High chemical efficiency
- Short regeneration time
- Simple construction and control
- Self-cleaning
- Insensitivity to product flow variations and stops
- No risk of carry-over of resin fines
- Layered bed design without the need for a middle plate

System Features

- Multiple vessel modular construction. Modules are piped together for required capacity.
- Vessels, piping and valves, and system controls shipped as an integrated shop-assembled system
- Completely automated PLC controlled regeneration and recycle system
- All required flow instrumentation
- Pressure gauges and sample points
- NSF 61-compliant vessel lining
- ASME Code Sect. VIII, Div. 1 pressure vessels
- Ductile iron (water) and stainless steel (regenerant) piping
- Finish painted vessels, piping, and components
- Galvanized support skid

Optional Features

- PVC piping system
- Effluent monitor
- Automatic finished water blending
- NSF-compliant abrasion resistant vessel lining

Layne's Dowex Upcore Specifications

Vessel sizes	from 48" to 120" diameter
Surface loading rate	13-22 gpm / sq ft
Pressure drop	20-30 psi
Bed depth	60" or more
Contaminant removal	>99%
Waste produced	<0.1-1% of production
Regenerant	Sodium Chloride Brine (standard)
.	Potassium Chloride Brine (optional)
.	Acids (optional)
.	Bases (optional)
Media life	5-10 years typical
Vessel Rating	125 psig typical
Anion Resin	Dowex Upcore
Cation Resin	Dowex Upcore