



Radium Removal: RSC

High-Capacity Radium Selective Complexer



Layne Christensen Company's Radium Selective Complexer (RSC) media from Dow is specifically formulated to remove radionuclides directly from groundwater and aqueous streams, providing municipalities with a powerful adsorption technology for treatment of water supplies.

Radium and its isotopes naturally occur in many groundwaters in the United States. The USEPA and State guidelines have established 5pCi/L as the MCL for combined radium in potable water.

The RSC treatment process represents the very essence of operational simplicity with the raw water being applied in series to one or more beds of RSC, thereby enabling the water-soluble radium to be irreversibly complexed with the media matrix. The RSC media is used on a once-through basis and after its useful life, the spent RSC media is disposed of in accordance with all

applicable local, state and federal regulations as a Low-Level Radioactive Waste (LLRW).

The media's theoretical capacity for the removal of radium is "enormous and approximates over 20 nanocuries/gram", although in actual applications this loading rate is tailored to balance operating costs in concert with health, safety and environmental aspects associated with the plant operation.

While radionuclides can also be removed utilizing a conventional ion exchange process, the regeneration of the ion exchange resin results in the production of a waste brine rich in radium, which in many cases cannot be readily disposed to the sanitary sewer facilities. In other cases there may not be access to on-site waste brine disposal facilities thereby necessitating the off-site transport and disposal of the liquid brine waste.

Pump and Treat Mode

RSC can be used in a direct Pump and Treat Mode in small systems or alternatively, where conventional ion exchange is utilized, the spent brine can be treated with RSC prior to discharge to the sanitary sewer system. In certain cases the brine would be amenable to recycle and reuse, reducing operating costs.

Our Full Service Approach

- On-site pilot studies to evaluate media life and pre-treatment requirements.
- Engineering and EHS report for permit applications.
- Procurement, fabrication and shop assembly of skid-mounted modular systems with spent resin removal and resin replacement capability.
- Startup and training in system operation, monitoring, maintenance and media replacement procedures.
- Resin replacement and coordination of spent resin disposal services.
- Purchase, leasing and long-term financing options.
- "Balance of Plant" design and installation services for foundations, enclosure and battery limit tie-ins including wellhead modifications.



800.407.4449

www.laynechristensen.com

Layne Christensen Company

Water Technologies:
Define
Develop
Deliver



RSC Media Specifications

Typical Physical Properties

Physical Form	Spheres
Water Retention Capacity	65-75%
Packing Density	49 lb/cu ft. (780 g/l)
True Density	1.18-1.25 g/cc
Maximum Theoretical Capacity	10-20 nanocuries/gram
Operating Capacity	5-7 nanocuries/gram subject to EHS and disposal criteria

General Design Criteria

1. Surface loading rate: 7-15 gpm/sq ft
2. Pressure drop per bed: 8-13 psig
3. Bed Depth: 36-48 inches
4. Plant configuration: Series flow for "lead lag" adsorbers for maximum efficiency.
5. Backwash Rate: 6 gpm/sq ft for 50% bed expansion at 50°F
6. Recommended backwash freeboard: 50%
7. Backwash recovery and recycle: Recommended for Substantially Zero Liquid Discharge
8. Recommend pretreatment for suspended solids removal
9. Recommend sequestering to eliminate iron fouling of RSC
10. Post chlorination after radium removal
11. Avoid contact of RSC with strong oxidizing agents and mineral acids
12. Disposal of spent RSC to be in absolute compliance with applicable law

RSC Technology Advantages

- Exceptionally high capacity for radionuclides
- Radionuclides are irreversibly adsorbed to media matrix
- Direct treatment of well water in simple pump and treat mode
- Modular shop-assembled skid-mounted plants for rapid installation and startup
- Easy operation with systems configured for series countercurrent (lead-lag) operation for maximum efficiency
- High surface loading rates which result in reduced capital costs and high flow capacities per square foot of plant real estate
- Working capacities of between 5-7 nanocuries/gram resulting in several years of operation before media replacement is required
- Readily applicable to treatment of radium-laden spent brine from processes utilizing conventional ion exchange for radium removal

Contact your
Layne Christensen Company
Water Technologies representative:

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