Graver Technologies

Filtration | Separation | Purification

MetSorb® ADSORPTION MEDIA

Arsenic, Antimony, Lead and Uranium Removal from Drinking Water

MetSorb® granular adsorbents utilize a patented material to adsorb multiple metals at once. Empty bed contact times as low as 90 seconds achieves high removal efficiencies. The media affords a higher capacity and a lower level of ion interference than competitive iron and alumina based products.

MetSorb® media's works in drinking water applications with a pH range of 6.5-8.5.

Treatment is required with drinking water levels of:

Arsenic (As)

10 µg/L (10 ppb) in both the US and Canada

Health impacts: Skin damage or problems with circulatory systems, and possible increased risk of getting cancer. Adsorbed through the skin (such as showers)

Mostly found in the West, Southwest and Northeast

Antimony (Sb)

6 µg/L (6 ppb) in both the US and Canada

Health impacts: high cholesterol and decreased blood sugar. Potential carcinogen.

Found intermittently everywhere

Uranium (U)

30 µg/L (30 ppb) per EPA guidelines

20 µg/L under Canadian MAC (Maximum Acceptable Concentration) guidelines

Health impacts: Increased risk of cancer, kidney toxicity

Found in the Midwest and East prevalently

Lead (Pb)

Levels of 15 µg/L is an action level in the US

5 µg/L under Canadian MAC regulations

Health Impacts: Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems and high blood pressure.

Caused by older lead soldered pipes or natural deposits

Found intermittently all over

Usage:

Point of Entry (POE, whole house) or point of use (POU, under sink) applications.

Occurance:

Ongoing water quality compliance testing has confirmed the presence of Arsenic, Antimony, Uranium and/or Lead and in many cases multiple contaminants, in water systems across the country. In New England, regulators have identified the co-occurrence of Arsenic and Uranium, and with the support of the U.S. Geological Survey (USGS), are extending the water quality evaluations to include private residential wells. Kansas similarly maintains aquifers impacted with naturally occurring arsenic and uranium. In the West and Southwest, where the arsenic problem is most pronounced, co-occurrence with Uranium or Antimony is not uncommon. Sourcing treatment to effectively address both Arsenic removal and Uranium removal can represent additional challenges for small community water systems.

Independent evaluations are concluding that Adsorption technologies often present a series of benefits:

- Lower Capital Costs
- Equipment and Installation
- Packaged Units – Small Footprint
- Reduced Operational and Maintenance Activities
- Less Operational Oversight
- Less Mechanical/Electrical Sophistication
- Reduced Waste Generation
- Minimal Backwash
- No waste sludge generation

Conclusions:

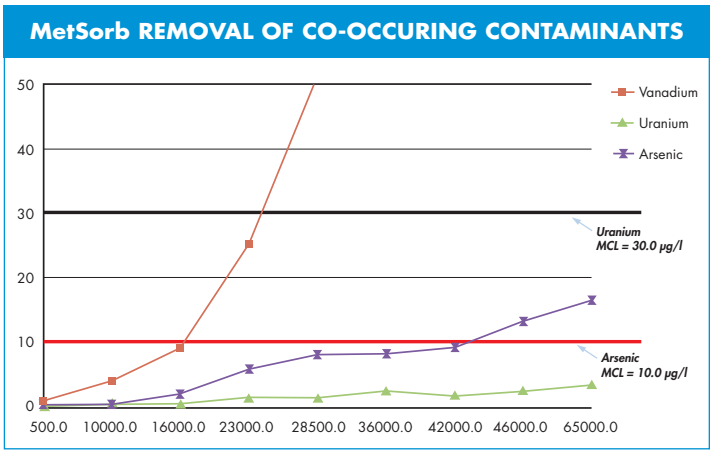
The data concluded that the nano-titanium oxide adsorbent media (MetSorb®) effectively removed both Arsenic and Uranium to below the safe drinking water MCL for each primary contaminant. A graph of the data is presented in Graph 1. The data also suggests a high level of selectivity of the nano-titanium oxide to both Arsenic and Uranium, given the operation of the test unit at 3.5 minutes of EBCT. An increase in EBCT to 4 or 5 minutes would be expected to provide further removal efficiency for Arsenic, Uranium and Vanadium. The continued application of Adsorbent Technologies as cost-effective treatment solutions for Arsenic removal should be expanded to included co-occurring contaminant challenges such as Arsenic and Uranium. This becomes even more applicable for small water systems where financial and human resources are limited and cost effective, easy-to-operate treatment solutions are needed.

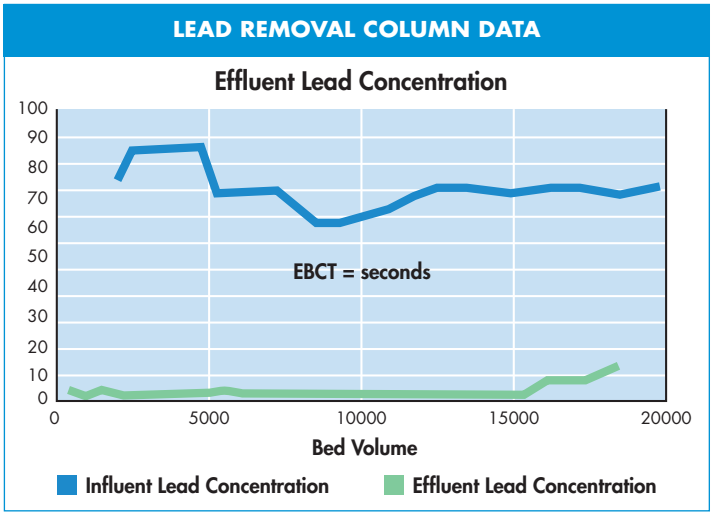
It is recommended that a characterization of the saturated media be conducted for proper disposal consideration under the Federal Resource Conservation and Recovery (RCRA) as well as State and local disposal restrictions. However, testing conducted from 2004 to present has concluded RCRA characterization as non-hazardous for disposal.

Table 1:

	pH	Total Hardness	Silica	Arsenic	Uranium	Vanadium
Units	units	mg/l	mg/l	µg/L	µg/L	µg/L
Value	8.9	28.0	47.0	21.0	38.8	322.0

Graph 1:





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