

HEAVY METAL IN FLUIDS CAPTURE

WorkBeads™ Metal

An innovative Heavy Metal Capture System.

Effective and Efficient Treatment of Fluids Containing Heavy Metals.



A Breakthrough in Heavy Metal Capture State of the Art Technology

Experimental data and initial field trials tell that even at parts per trillion (ppt) levels the newest product **WorkBead™ Metal** separation media is able to capture heavy metals in the high 90 percentile range. Indeed, lab trials have shown Mercury (Hg) capture above 99%, even at ppt levels!

The experimental data below illustrate typical capture percentages for some heavy metals using the patented chelating technology:

| Metal (mg/L) | Before | After | Reduction (%) |
|----------------|--------|--------|---------------|
| Mercury Hg2+ | 0,270 | 0,0006 | 99,7 |
| Arsenic As5+ | 5,000 | 0,0000 | >99 |
| Cadmium Cd2+ | 0,220 | 0,0010 | 96,0 |
| Chrome Cr3+/5+ | 0,016 | 0,0020 | 88,0 |
| Nickel Ni2+ | 0,043 | <,0009 | 98,0 |
| Lead Pb2+ | 0,086 | 0,0087 | 90,0 |
| Aluminum Al3+ | 0,066 | 0,0077 | 89,0 |
| Zinc Zn2+ | 2,900 | 0,0750 | 98,0 |
| Uranium U3+ | 0,740 | 0,0060 | 99,7 |

The capacity for e.g. Copper is 20 g/L of adsorbent. Binding of Copper is used as quality control of the adsorbent.

The exciting new product combines the rigidity and performance of WorkBead™ micron Agarose Separation Media with

patented chelating technology from Sweden.

Agarose is produced from agar, widely used in the food industry. It is derived from seaweed and is hence environmentally friendly and CO₂ neutral on incineration.

The metals can be washed off and the adsorbent reused multiple times.

Further, the patented Agarose production technique helps you to keep costs down, allowing you to better address process economics.

High Throughput Heavy Metal Capture

Industrial and Municipal entities are seeking cost-effective solutions to trace element removal, particularly, heavy metals, which in many cases are toxic in very low concentrations. As environmental standards tighten and require lower permitted levels of heavy metals in effluents, there is a need to remove ionic forms of the metals which can not be removed by more common chemical or filtration method.

WorkBeads™ Metal can capture exceptionally high levels of heavy

metals at extremely low concentrations in conditions where very high throughput is required.

As an example, ongoing field trials with a customer in the oil and gas industry are designed to give data to engineer a system that will handle between 2 and 5 million liters of process water ('produced water') per day!

The picture on the next page shows a field trial unit for removal of arsenic from produced water to generate data for engineering of large scale installations.

Often, the massive scale of municipal, process and produced water means that huge volumes must be accommodated. We are able to help companies design solutions which team high throughput technology with the performance and capacity of large 400 micron beads.

This combination means systems can be designed to handle flow rates necessary to fit the needs of today's industrial customer.

Small Scale Industrial Applications

Factory sites do not always require continuous, high-throughput processing of process waste water. Often, waste

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streams with particularly high heavy metal concentrations are stored for later disposal. These lend themselves better to batch-treatment.

For this type of application, we use a simple, small foot print column filled with WorkBeads™ Metal which can be easily installed in nearly any factory setting.

The picture below shows small scale units with capacities up to 6.000 L/day that can be used to treat smaller volumes of process water.

Operation of the system is simple. The contact time of our separation media means that the waste stream can simply be filtered through the media and still capture heavy metals in the high 90 percentile range.

The data suggests that, should other factors in the waste water not preclude it, the effluent water from the filter process will meet most environmental standards for direct disposal into municipal waste water streams.

Depending on the concentration of the heavy metals and the composition of the waste water, the media can last up to a year before it needs to be changed.

The changeover operation is also very simple – the operator only needs to replace the separation media filter bag!

'Mining' Precious Heavy Metals From Waste Streams

Increasingly, companies are also interested in capturing some of the more expensive metals, such as Nickel, that are often thrown out in waste water.

The technology creates the potential to 'mine' these metals from process water streams. Capture and removal of these metals from wastewater offers the potential to mitigate the costs of

process water treatment. While the economics of each 'mining' process must be examined, we strongly believe the technology is in place to make extraction of precious heavy metals from waste water a reality!

Summary WorkBeads™ Metal

- captures ionic heavy metals even at extremely low concentrations;
- can be regenerated, making it very economical;
- can be used for small scale or high throughput applications;
- has the potential to 'mine' value from waste streams

Please find contact details below for more information.



Pictures

- trial unit for removal of arsenic from produced water
- and
- small scale units with capacities up to 6.000 liter/day

