

250 99TE

ARSENIC CONTAMINATION MITIGATION PROGRAMME

MINISTRY OF
HEALTH
&
FAMILY
WELFARE
GOVERNMENT
OF THE
PEOPLE'S
REPUBLIC OF
BANGLADESH

250-15728

Test Report of Arsen: XTM Filter in removing arsenic from Tubewell water

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Introduction

The recent detection of high level of arsenic concentration in numerous shallow tubewell water mostly across Bangladesh has caused serious problem for supplying safe water for drinking and other domestic uses. It is reported that more than 7000 people are suffering from arsenic related diseases ranging from melanosis to skin cancer. It has also been reported that about 70 million people are likely to be affected through probable arsenic contamination of shallow tubewells currently serving as water points mainly for drinking and cooking purpose.

Efforts to develop remedial solution are still far from making a comprehensive breakthrough. Known arsenic removal methods work fairly well only under strictly controlled conditions, making such use impractical at household level. The fate of affected patients in terms of developing drugs, remain even more uncertain. Researchers are, however, unanimously agreed that the known treatment so far is the immediate cessation from the use of arsenic contaminated water and resumption of the use of arsenic free water.

As arsenic contamination of groundwater is becoming widespread, the increasing awareness of people is enticing them to find a remedial measure. They are looking forward to an alternative source that is safe, cost-effective, available and acceptable.

Technologies available for removal arsenic of are many but none is found suitable due to their operational problems. The major problem identified with those is safe disposal of removed arsenic sludge. Followings are the available technologies for removal of arsenic from water:

| | |
|-------------------|--|
| Activated alumina | Low capacity Arsenic laden waste Regeneration producees arsenic laden regenerate solution |
| Iron filling | Discoloured water, bad taste Additional treatment necessary Bacteria contamination probable Hazardous waste |
| Coagulation | Several steps process Equipment required Arsenic laden waste High volume of sludge |
| Activated resin | Low capacity Equipment required Arsenic laden waste |

Arsen.X™ is a new filter technology prepared with close association of Dr A Z M Iftikhar Hussain, Deputy Programme Manager (Arsenic), Ministry of Health and Family Welfare, Government of Bangladesh and Mr Tanjim Ahmed of Bangladesh Water For All and a USA based Manufacturer of this kind.

Characteristic of filter

Arsen X™ is a new technology for arsenic removal and this is the only technology that totally solves the problem. It is simple and easy to use. No electric pumps are required. Its capacity is very high and it is long lasting. It is cost effective per litre treated and there is no disposal problem of arsenic laden waste. It can be simply scaled up to larger systems. Arsen:X™ is made of super activated mixed metal oxide. It has high capacity for arsenic adsorption with fast kinetics property. It binds arsenic irreversibly and can be safely land filled or recycled. The system combines multiple media for speciation, removal and clarification.

Lab Test:

Venue: DPM(Arsenic)'s Laboratory, NIPSOM, Mohakhali, Dhaka

Test no. 1: Water sample collected from Noakhali containing 0.5mg/l arsenic concentration (Tested by merk field test kit). Water was passed through the laboratory replica filtre Arsen:X™ and crystal clear water came out from the delivery tube. The outcome water was tested and no arsenic was found (0.0mg/l) in the filtered water. The test was repeated for five times and result was same.

Test no. 2: Water sample collected from Sonargaon thana containing >0.1mg and <0.5mg/l arsenic concentration (Tested by Merk field test kit). Water was passed through the laboratory replica filtre Arsen:X™ and crystal clear water came out from the delivery tube. The outcome water was tested and no arsenic was found (0.0mg/l) in the filtered water. The test was repeated for five times and result was same.

The test appeared reliable and valid.

Field test:

A field test was done at Vadrpara village of Mohinanda union under Kishoreganj sadar thana upon request of Hon'ble Minister of LGRD and Co-operatives and the Secretary, LGD. The test was witnessed by local UNDP officials, TNO, Executive Engineer, DPHE, Chairman, Union Parishad and other village people including owner of the tubewell. The tubewell water was reported to be contaminated with unacceptable level of arsenic. The test team tested the tubewell water and found water contaminated by arsenic with the concentration level of 0.1mg-> 0.5mg/l.

Water was passed through the laboratory replica filtre Arsen:X™ and crystal clear water came out from the delivery tube. The outcome water was tested and no arsenic was found (0.0mg/l) in the filtered water. The test was repeated for five times and result was same.

The present test has been carried out to assess the potential for this filter as an alternative option to provide arsenic free safe water for drinking and cooking purpose at household level. The tests were conducted by Dr Hassina Momotaj, Research Associate, Arsenic programme, MOH&FW and Dr A Z M Iftikhar Hussain, Deputy programme Manager(Arsenic), MOH&FW, NIPSOM Building, Dhaka.

OSTERTECH INC.



WATER FOR THE WORLD

Arsen:XTM Systems

Bangladesh Water for All

Ostertech Inc.

Highsmith Environmental Consultants, Inc.

SolmeteX, Inc.

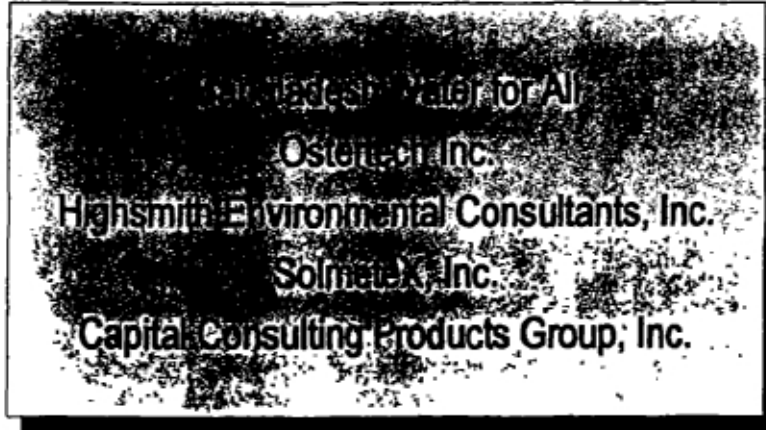
Capital Consulting Products Group, Inc.

Ostertech Inc.



WATER FOR THE WORLD

Arsen: X™ Systems



Overview

- A new technology for arsenic removal.
- Only technology that totally solves problem.
- Simple, easy to use.
- No electricity or pumps required.
- High capacity, long lasting.
- Low cost per gallon treated.
- No disposal problems.
- Simple scale up to larger systems.

Arsen:XTM - A New Technology

- Super Activated Mixed Metal Oxide.
 - High Capacity for Arsenic Adsorption.
 - Fast Kinetics.
- Binds Arsenic Irreversibly - May be Landfilled or Recycled.
- Systems Combine Multiple Media for Speciation, Removal and Clarification.

Arsen:X™ - Model AH-50

Three Stage Media Bed

- Speciation

- Removal

- Clarification

Dispensing Spout

Disinfection Included

Direct Connection to Well

Optional Reservoir



Other Technologies

Activated Alumina

**Low Capacity
Arsenic Laden Waste
Regeneration Produces Arsenic
Laden Regenerate Solutions**

Iron Fillings

**Discolored Water, Bad Taste
Additional Treatment Necessary
Bacteria Contamination Probable
Hazardous Waste**

Coagulation

**Several Step Process
Equipment Required
Arsenic Laden Waste
High Volume of Sludge**

Summary

- Only Technology That Totally Solves Problem
- Only TCLP Tested Technology.
- High Capacity - Longest Life
- Simplest to Use - Just Pump Water In
- Low Cost
- Light Weight - Easy to Ship and to Carry

Arsen:X™ adsorbent is a unique inorganic matrix, which selectively adsorbs and binds targeted multivalent anions (compounds with 2 or more negative charges), while ignoring all positive and -1 charged compounds. Arsen:X™ media will irreversibly bind arsenic, chromium (VI), selenium, EDTA and citrate metal complexes, ferric cyanide, silver from photographic waste, and numerous other metal complexes with very high loading rates.

Arsen:X™ media offers significant benefits over conventional techniques.

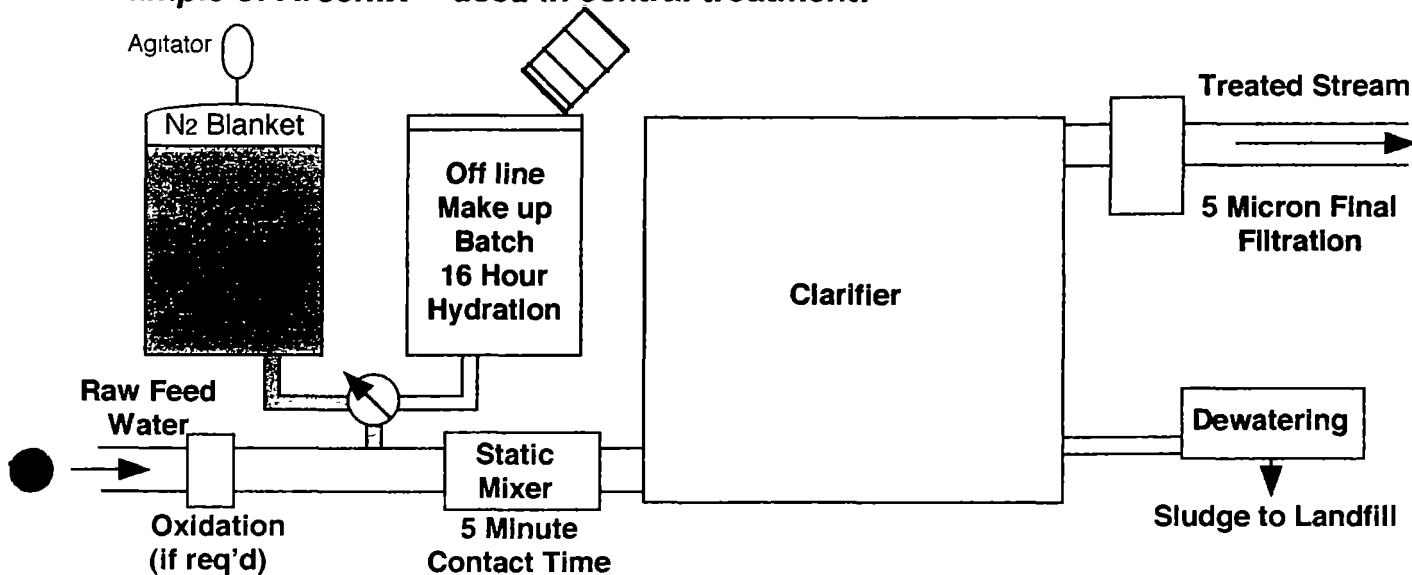
- * **Arsen:X™ directly adsorbs** arsenic, selenium, chromium VI, and other metal complexes with little or no pretreatment.
- * **Arsen:X™ is available in forms** suitable for either dose/clarification or flow through applications, and it is easily integrated into conventional water and wastewater treatment systems.
- * **Arsen:X™ systems** suitable for point-of-use applications are economical, requiring minimal capital, low operating costs, and little or no maintenance.
- * With **Arsen:X™** there is a **very low sludge volume**.
- **Arsen:X™ can be safely land-filled or recycled** as non-hazardous material, as loaded media passes TCLP leachate tests (Toxicity Characteristic Leaching Procedure). Removal of arsenic from water is accomplished by a unique bonding of the arsenic into the molecular structure of the Arsen:X™, and therefore does not disassociate.
- When **Arsen:X™** is working, **the pH will increase slightly, making systems EASY TO MONITOR**. In drum based systems, it is recommended that two drums be used in series, running the system until the first drum is saturated. This is easily monitored by checking the pH and noting when it returns to the pre-treatment level. When the first drum is saturated, remove and dispose the first drum. Move the second drum into the place of the first drum. Put a new drum in the second place. This way a backup drum will always be "active". This allows the first drum to become fully saturated, rather than be removed at the first sign of breakthrough.

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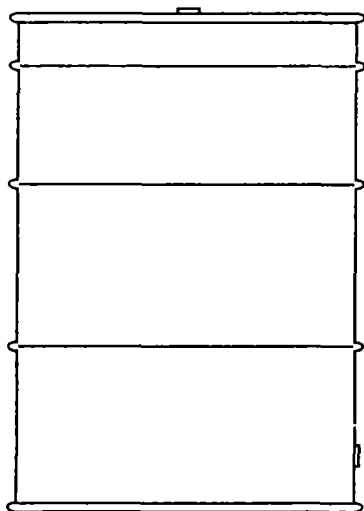
37 North Forge Manor Drive, Phoenixville, Pennsylvania 19460
ph/fax: 610-935-0666 email: lewo@att.net

Arsen:X™ - Arsenic Removal Applications

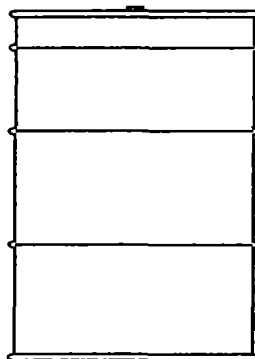
Example of Arsen:X™ used in central treatment:



Arsen:X™ Point of Use Systems:



Model AD5
5 gpm



Model AD52
2.5 gpm



Model AC0.5L
0.5 lpm

NOTICE All suggestions and recommendations given above concerning the use of Arsen:X™ are based on tests and data believed to be reliable. However, as Ostertech cannot control the use of its products by others, no guarantee is either expressed or implied by any such suggestion or recommendation by Ostertech nor is any information contained on this data sheet to be construed as a recommendation to infringe on any patent currently valid.

Available exclusively from:

OSTERTECH INC.
37 North Forge Manor Drive, Phoenixville, Pennsylvania 19460
ph/fax: 610-935-0666 email: lewo@att.net

COMPANY INFORMATION

SolmeteX, Inc., Gets the Heavy Metals Out – Efficiently and Economically

Owen Boyd, Chairman of SolmeteX, Inc., knows that clean water is the most important natural resource to mankind. It fills our streams, rivers, and lakes to provide us with a recreational outlet. It's critical to research, development, and manufacturing processes. It's vital to medical and technological advances. Boyd also knows that heavy metal contamination of water is a real problem that must be addressed. If left unchecked, these metals can cause cumulative damage to your health or the health of your children.

Hospitals, printing plants, laboratories, manufacturers of high tech products – even your dentist -- use heavy metals like silver, mercury or arsenic every single day in the course of doing business. These toxic metals must be discharged in wastewater. Most facilities utilize a central treatment plant to remove these dangerous metals and metal compounds prior to wastewater discharge, but the methods used in these plants are out of date and often ineffective. It just so happens that SolmeteX has developed a new technology employing selective resins, which remove toxic metals from wastewater in an effective, economical manner compared to traditional methods

Moving water purification into the twenty-first century

The seed for SolmeteX was actually sown while Boyd was a principal in a company that developed electrical power plants with a patented carbon dioxide recovery system. During the course of figuring out how to spend less money on its first power plant and carbon dioxide plant, Boyd discovered that water was a major cost element. "Upon examining our water polishing method," remarked Boyd; "I was amazed to discover that the technology we used was developed before World War II!" Boyd then reviewed the literature and found that over 90% of the water treated in the United States were treated with technology developed before World War I. For Boyd, there had to be a better way.

The opportunity presented itself while Owen Boyd was reading the Business Section of the *Boston Sunday Globe* which carried an article about a company that had developed a technology to increase the efficiency of ion separation by 10,000 fold. This sparked an idea and Boyd met with Richard Hamilton, the scientist named in the article, to find out if a similar technology could be applied to wastewater. Thus, SolmeteX was born. Boyd and Hamilton started the company late in 1994 and they began the technology development process in a small office in Walpole, Massachusetts

Today, Boyd and Hamilton take pride in the fact that their technology can remove a specified metal completely from wastewater. How does it work? It's simple. Rather than utilizing the non-specific mechanisms employed by older water purification methods, such as carbon filtration or ion exchange, SolmeteX develops resins with unique "surface chemistries." The Company has developed resins that selectively remove the target metals, such as mercury, arsenic, copper and nickel, as well as other heavy metals. The key difference between SolmeteX resins and all the others is that the SolmeteX resins remove only the target metal, making recovery and recycling possible. Contaminated waste or process water flows through columns containing these beads and their unique surface chemistry catches the targeted toxic metals. The clean water is then either safely discharged or returned to the process

Hamilton is quick to point out that SolmeteX beads bind a targeted metal so tightly that very often the levels left in the treated water are below the part per billion (ppb) levels. This allows the nearly pure metal to be recovered or recycled. Resin selectivity provides a twofold advantage. The first is efficiency. Selectivity results in smaller columns for improved performance and more cost-effective systems. The second is economy. Because metals that are not problematic, like iron, are not removed, there is no wasted chemistry. In addition, those metals that are selectively removed can be recovered and put back into the merchant market, rather than going to landfills as hazardous waste.

In 1997, SolmeteX introduced its first product, Metall:X™, an inorganic resin that binds chromium (VI), selenium, EDTA, citrate metal complexes, ferric cyanide, silver, and arsenic with very high loading rates. It recently introduced Keyle:X™, the first of a series of selective metal binding resins that are highly specific and selective for mercury. Keyle:X is targeted at clinical labs, medical waste incinerators, dentists and dental labs, and manufacturers of chlorine and caustic. To give you an idea of the scope of the opportunity, Jim Cannon, executive vice president of SolmeteX, points out that there are upwards of 200,000 clinical testing analyzers alone used worldwide.

SolmeteX packages these resins in compact systems that are small enough sit on a lab counter and large enough to fit in a tractor-trailer. Water can either be treated at the point of use or after the main treatment system.

An innovative, permanent solution that won't break the bank

The SolmeteX approach to heavy metal contamination is not only effective but also economical. The systems themselves are more efficient and are much smaller than traditional wastewater treatment systems. They provide the same flow rate as conventional systems, but cost much less. Waste hauling is reduced because the high capacity resins reduce the system size and the amount of waste generated. SolmeteX systems are also designed to recover and recycle the metals whenever possible, reducing the risk of expensive Superfund litigation. Finally, the resins and adsorbents developed by SolmeteX are designed for use with traditional water treatment systems. The innovation is in the resins themselves, not in the packaging of the resins. With the unique SolmeteX approach, removal of heavy metal contamination prior to wastewater discharge is now affordable for all.

A company on the rise

For SolmeteX, the future is bright. It is anticipated that sales will reach \$1 million in 1998. In February of this year they signed a multi-million dollar contract with Beckman Instruments (now Beckman Coulter), an international manufacturer of clinical laboratory testing equipment, to supply its customers with a compact device for the removal of mercury from laboratory samples and waste. In addition, SolmeteX recently received \$1.5 million in venture capital from Del Tech Ventures of Boston, and a Phase I Small Business Innovative Research Program (SBIR) Grant. The grant will assist with the development of an enhanced mass transport resin (with metal-selective chemistries) capable of effectively removing low concentrations of toxic metals in water running at high flow rates (up to 5,000 gallons per minute). Industries targeted with this product include mining, electrical power production, groundwater remediation, weapons manufacturing, and oil and gas.

SolmeteX products provide customers with economically and environmentally sound solutions to the problems of removing metals from water. The solutions are a series of adsorbents, Keyle:X™ and Metall:X™, that remove metals and metal complexes from water.

SolmeteX's core technical concept is to apply advances in separation technology made by the bio-pharmaceutical industry to industrial water treatment problems. The SolmeteX products are designed to selectively bind the target metals or metal complexes, bind them very tightly and rapidly and enable recovery or recycling of the metals or complexes. SolmeteX adsorbents and resins can be employed in conventional wastewater treatment systems.

SolmeteX systems successfully remove...

Mercury, Silver, Ferric Cyanide, EDTA complexes, Arsenic, Chromium (VI), Citrate complexes, Selenium, Copper, Nickel and Cadmium.

from the following sources...

Medical waste incinerators, Photographic and Newspaper Waste, Clinical Chemistry Analyzers, choler-alkali brine, mining waste water, electro-less plating, LED manufacturing, dental offices, CD manufacturing, clinical labs, histology labs, semi-conductor rinse water, circuit board manufacturing, and metal finishing waste water.



We Have the Solutions

Application Report – Arsenic Removal from Groundwater

Metall:X™ treatment system for Groundwater

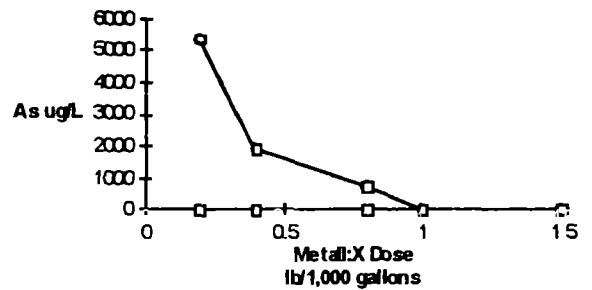
At a construction site in Belgium, waste construction materials were being stored in a 1,000 m³ storage pit. Over time, the pit had built up a serious concentration of arsenic from construction materials being stored in the pit being exposed to rainwater. The arsenic levels are far beyond any acceptable discharge limit. The construction management company was facing the reality of having to haul via tanker trucks all the water off site to a hazardous waste treatment facility for treatment. The measured arsenic levels were at 5,400 µg/l and had to be lowered to 50 µg/l in order to be discharged to the local sewer system. The off-site treatment costs were bid at a cost of \$ 160,000.00. On-site treatment using ferric chloride was estimated to cost approximately \$ 500,000.00 including disposal of the sludge which was estimated to be 110 ml of sludge for every gram of ferric chloride. This was thirty times greater than the estimate for Metall:X™ sludge

The solution proposed by SolmeteX engineers was to treat the entire amount of water by literally throwing Metall:X™ adsorbent powder into the open pit, letting it adsorb the arsenic ions, then letting it settle to the bottom. Once settled, the water could be pumped out and the Metall:X™ sludge hauled off to a landfill site. On-site test results showed that arsenic concentrations were reduced from 5,400 µg/l to 10 µg/l after treatment. Leaching tests of the sludge showed it to be non-hazardous and landfillable. The SolmeteX treatment system allowed the contractor to handle their arsenic problem in an environmentally sensitive manner while saving substantial dollars. It is estimated the savings exceeded \$55,000 as compared to off-site treatment. The ability of Metall:X™ to treat arsenic in solution is illustrated in Table 1. The Metall:X™ treatment system accomplished what none of the traditional systems were able to accomplish, benefit the client by meeting the discharge, and save money!

TABLE 1.

ARSENIC REMOVAL

Arsenic Results



The Metall:X™ Solution

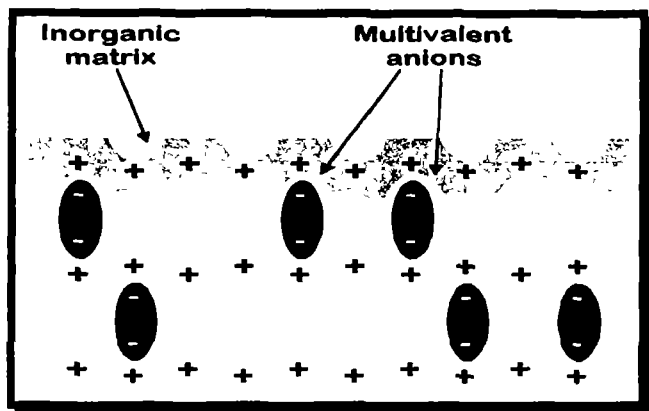
The entire SolmeteX treatment systems consists of 40 one thousand pound sling bags and a front end loader to dump the Metall:X™ into the pit. The ease of application of the technology represented a major savings for the construction company. The sophistication of the Metall:X™ systems are in their chemistry...not their application.

Metall:X™ adsorbent is made from a non-toxic inorganic mixed metal oxide which contains molecular "cavities" that very selectively bind multivalent anions (compounds with 2 or more negative charges). Monovalent anions are not bound to any significant extent. The multivalent anions are incorporated irreversibly into the plate-like crystal structure of the material. Anion binding capacity is typically 20% of the dry weight of the Metall:X™. Examples of metals that are removed from aqueous streams through the use of Metall X™ are Arsenic, as arsenate, Chromium (VI) as chromate, Silver and Ferrous Cyanide. Silver is removed as a complex of thiosulfate or as a complex of EDTA which are both multivalent anions and usually quite difficult to remove with most technologies. Metall X™ permanently binds these multivalent anions within its crystalline structure

Major Benefits of the Metall:X™ Arsenic System;

- Meet strict arsenic discharge requirements
- 50% savings in treatment costs
- 75% reduction on waste hauling
- Waste passes TCLP and can be safely land filled
- Enormous space savings

Graphic Representation of Metall:X™



The arsenic ions are permanently trapped within the Metall:X™ crystalline structure

Metall X™ is an inorganic adsorbent that irreversibly binds multivalent anions, including silver thiosulfate, arsenic, chromium (VI), selenium, EDTA, and citrate metal complexes

Metall X™ is available in forms suitable for dose & clarify or flow through applications

Metall X™ offers significant benefits in water treatment

- ◇ Directly adsorbs silver thiosulfate, arsenic, chrome VI & other metal complexes (EDTA, citrate)
- ◇ Flow through or dose & clarify process
- ◇ Treats to very low discharge levels
- ◇ Easy to use - fully compatible with existing systems
- ◇ Economical - minimal capital & low operating costs
- ◇ Stable, low sludge volume - passes TCLP
- ◇ Non-toxic, fully contained treatment material
- ◇ Small system - suitable for point-of-use applications
- ◇ Maintenance free

Metall:X™

Metall X™ rate of metals adsorption is extremely fast allowing the application of the product to use much less space than conventional technologies. Storage tanks, pumps, vessels, etc. is reduced in size

*Smaller Systems = less equipment = less space
= LESS COST*

Applications of Metall:X™

Metall X™ is in use in the following areas solving wastewater problems that were previously too expensive to address:

- ◇ Photo-processing Wastewater treatment
- ◇ Industrial wastewater treatment
- ◇ Electroless plating and metal finishing
- ◇ Groundwater remediation
- ◇ Mining
- ◇ Laboratory wastewater cleanup

SolmeteX - The Company

SolmeteX products provide customers with economically and environmentally sound solutions to the problems of removing metals from water. The solutions are a series of adsorbents, Keyle X™ and Metall X™, that remove metals and metal complexes from water

SolmeteX's core technical concept is to apply advances in separation technology made by the biopharmaceutical industry to industrial water treatment problems. The SolmeteX products are designed to selectively bind the target metals or metal complexes, bind them very tightly and rapidly and enable recovery or recycling of the metals or complexes. SolmeteX adsorbents and resins can be employed in conventional waste water treatment systems

SolmeteX systems successfully remove...

Mercury, Silver, Ferric Cyanide, EDTA complexes, Arsenic, Chromium (VI), Citrate complexes, Selenium, Copper, Nickel and Cadmium

from the following sources...

Medical waste incinerators, Photographic and Newspaper Waste, Clinical Chemistry Analyzers, choler-alkali brine, mining waste water, electroless plating, LED manufacturing, dental offices, CD manufacturing, clinical labs, histology labs, semiconductor rinse water, circuit board manufacturing, and metal finishing waste water

Contact SolmeteX for a waste characterization study or for additional information.

Rev.10.98



We Have the Solutions

Application Report – Arsenic Removal from GaAs Wafer Production

Arsenic Removal with Metall:X™

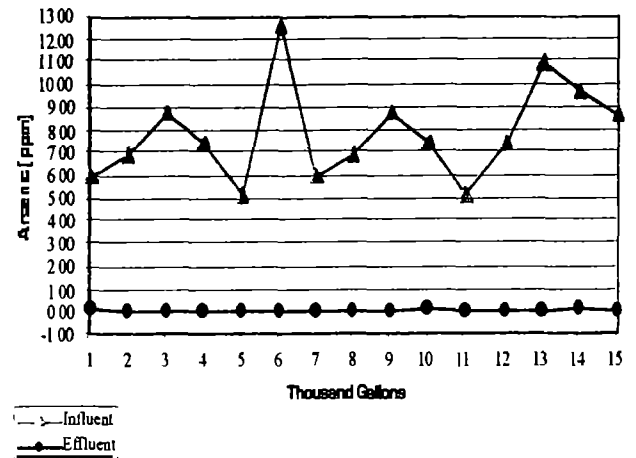
The manufacture of GaAs wafers entails the cutting and grinding of the wafers with water used for cooling. The resulting wastewater is contaminated with soluble Arsenic and cannot be discharged. A current treatment method requires the microfiltration of the effluent with 0.1µm membrane filtration followed by Ion Exchange resin and/or ferric/sulfate co-precipitation followed by final microfiltration. This method does not reduce the arsenic to acceptable discharge levels in most operations. The wastewater must be hauled by a permitted waste hauler to a hazardous waste treatment facility. The spent Ion Exchange resin and Arsenic contaminated sludge must also be treated as a Hazardous material and must be removed by a permitted company. The SolmeteX system utilizes the proprietary polyvalent adsorbent Metall:X™ for removal and reduction of arsenic to levels that permit discharge or reuse of the wastewater. The SolmeteX system is less expensive, has greater capacity, generates less sludge (1/25th), higher flow rates and utilizes significantly less space than any competing system or technology. Additionally the spent Metall:X™ passes TCLP and can be safely land filled when change out is required.

The SolmeteX solution for the arsenic removal system incorporates mild oxidation, pre and post micron filtration and the Metall:X™ adsorbent in flow through columns. The system is modular permitting easy change out of columns and the ability to expand the system with minimal expense.

At a manufacturer of GaAs wafers, the SolmeteX system saved the company over \$100,000 in capital equipment. The system also reduced the cost per gallon of treating and hauling from over \$1.25 per gallon to less than 05¢. The disposal cost for the Ion Exchange resin and ferric/sulfate sludge was also eliminated thereby further increasing the cost savings for the company. The SolmeteX arsenic removal system is so compact that the customer is able to increase the production of GaAs wafers without requiring additional waste treatment space. The competitive system required the addition of physical space to the building if the production of wafers was to increase. The Metall:X™ treatment system accomplished what none of the traditional systems were able to accomplish – meeting the discharge limit, reduce space required, no hazardous sludge and save money!

TABLE 1.

ARSENIC REMOVAL



The Metall:X™ Solution

Metall:X™ adsorbent is made from a non-toxic inorganic mixed metal oxide which contains molecular "cavities" that very selectively bind multivalent anions (compounds with 2 or more negative charges). Monovalent anions are not bound to any significant extent. The multivalent anions are incorporated irreversibly into the plate-like crystal structure of the material. Anion binding capacity is typically 20% of the dry weight of the Metall:X™. Examples of metals that are removed from aqueous streams through the use of Metall:X™ are Arsenic, as arsenate, Chromium (VI) as chromate, Silver and Ferrous Cyanide. Silver is removed as an EDTA or thiosulfate complex which are difficult to remove with competitive technologies. Metall:X™ permanently binds these multivalent anions within its crystalline structure.

Major Benefits of the Metall:X™ Arsenic System;

- Meet strict arsenic discharge requirements
- Reuse or discharge of process water
- 80% savings possible in treatment costs
- 95% reduction on waste hauling
- Waste passes TCLP and can be safely land filled
- Compact foot print

Applications of Metall:X™

Metall X™ is in use in the following areas solving wastewater problems that were previously too expensive to address

- ◇ GaAs Wafer Processing
- ◇ LED chip manufacture
- ◇ Photo-processing Wastewater treatment
- ◇ Industrial wastewater treatment
- ◇ Electroless plating and metal finishing
- ◇ Groundwater remediation
- ◇ Mining
- ◇ Laboratory wastewater cleanup

Metall X™ is an inorganic adsorbent that irreversibly binds multivalent anions, including silver thiosulfate, arsenic, chromium [VI], selenium, EDTA, and citrate metal complexes.

Metall X™ is available in forms suitable for dose & clarify or flow through applications

Metall X™ offers significant benefits in water treatment:

- ◇ Directly adsorbs silver thiosulfate, arsenic, chrome VI & other metal complexes (EDTA, citrate)
- ◇ Flow through or dose & clarify process
- ◇ Treats to very low discharge levels
- ◇ Easy to use - fully compatible with existing systems
- ◇ Economical - minimal capital & low operating costs
- ◇ Stable, low sludge volume - passes TCLP
- ◇ Non-toxic, fully contained treatment material
- ◇ Small system - suitable for point-of-use applications
- ◇ Maintenance free

Metall:X™

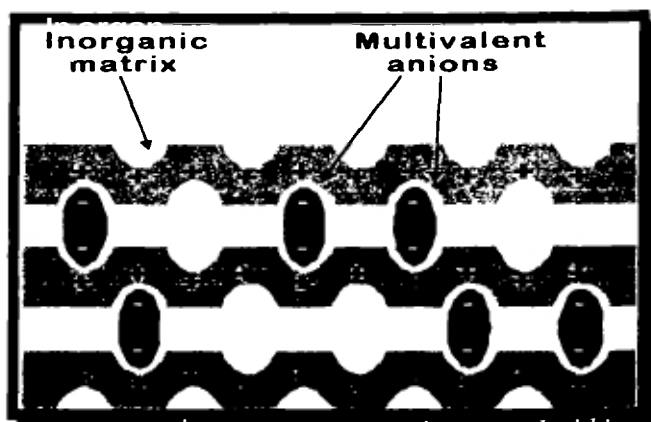
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*Smaller Systems = less equipment = less space
= **LESS COST***

Ordering Information:

| <u>Cat. #</u> | <u>Description</u> |
|---------------|---|
| MXG 00 01FD | Flow drum with hydrated Metall X™ Granular, with top and bottom distributor manifolds |
| MXG 00 01RFD | Replacement Flow drum with hydrated Metall X™ Granular, with bottom distributor manifolds |

Graphic Representation of Metall:X™



The arsenic ions are permanently trapped within the Metall:X™ crystalline structure

SolmeteX - The Company

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from the following sources...

Medical waste incinerators, Photographic and Newspaper Waste, Clinical Chemistry Analyzers, choler-alkali brine, mining waste water, electro-less plating, LED manufacturing, dental offices, CD manufacturing, clinical labs, histology labs, semi-conductor rinse water, circuit board manufacturing, and metal finishing waste water

Contact SolmeteX for a waste characterization study or for additional information

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