MetClean™
Heavy Metals Removal
Without Sludge Generation
Veolia Water Technologies' patented MetClean technology is an innovative yet proven process for reducing heavy metals from water and wastewater.

MetClean technology utilizes an adsorption process in a fluidized bed reactor to remove a wide range of metals.

By using the MetClean process, the waste product is reduced up to 20 times compared to conventional methods. The final product resulting from the treatment is a granule with a dry solids content of 80-90%. The savings in waste disposal cost can normally be sufficient to finance the capital and operating costs of the MetClean technology. Treatment efficiency is as high as 99% in a one process step.

The footprint of the MetClean process is relatively small, making it a very cost-effective solution for several applications.

Key MetClean Benefits:

- Highly cost-effective treatment process
- CAPEX is offset by reduced OPEX within a short time-frame
- Final waste product reduced up to 20 times
- One-step process with a small footprint
- Low concentrations of heavy metals in treated water
- No regeneration or backwash required
- No separate sludge dewatering required
- No caking

Types of Heavy Metals Removed with MetClean

<table>
<thead>
<tr>
<th>Antimony</th>
<th>Mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>Molybdenum</td>
</tr>
<tr>
<td>Barium</td>
<td>Nickel</td>
</tr>
<tr>
<td>Cadmium</td>
<td>Radium</td>
</tr>
<tr>
<td>Chromium</td>
<td>Selenium</td>
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<tr>
<td>Cobalt</td>
<td>Uranium</td>
</tr>
<tr>
<td>Copper</td>
<td>Vanadium</td>
</tr>
<tr>
<td>Lead</td>
<td>Zinc</td>
</tr>
</tbody>
</table>

“Removes up to 99% of the heavy metals in a one-step process”
Technical Details

The waste stream is used to fluidize granules, typically quartz sand, in the reactor column. By adding iron, manganese and an oxidizing agent to the wastewater, the metals are adsorbed on the granule surfaces and oxidized.

This is a continuous process, and the metal coating increases the diameter of the granules. Approximately 10% of the granules are removed from the bottom weekly, and about 3% of fresh sand is added to the top.

These granules are the waste product of the process. They contain about 10% water and are easily dried and handled.

Applications:

MetClean is capable of removing most heavy metals from water and wastewater.

- **Flue gas desulfurization wastewater** from power plants, solid waste incineration plants and refineries. MetClean is highly suited for this heavily contaminated wastewater and offers a substantial reduction in treatment and waste disposal costs. In fact, MetClean is capable of treating a range of metals to lower ppb levels than can be achieved in a traditional precipitation plant. In this application, the elimination of the sludge problem is a very obvious advantage.

- **Industrial wastewater** from primary metals and mining applications including tailings ponds.

- **Groundwater** contaminated by leaching metals can be treated in a dedicated fluidized bed reactor. Typical applications include chromium removal at metal coating facilities or fly ash landfills.

- **Potable water** contaminated with nearly all types of heavy metals -- from arsenic to zinc -- as a result of pyrite oxidation. This problem can be solved by installing a MetClean treatment unit at the existing water supply facility.
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