MINETEK

Water Evaporation Technology.

Innovative water management solutions.

Minetek Water.

Mechanical evaporators & water quality.

Can Minetek Water Evaporators process challenging water qualities?

The Minetek Evaporator is uniquely designed to be able to process a vast range of varying water qualities. We currently have units operating around the world that are evaporating:

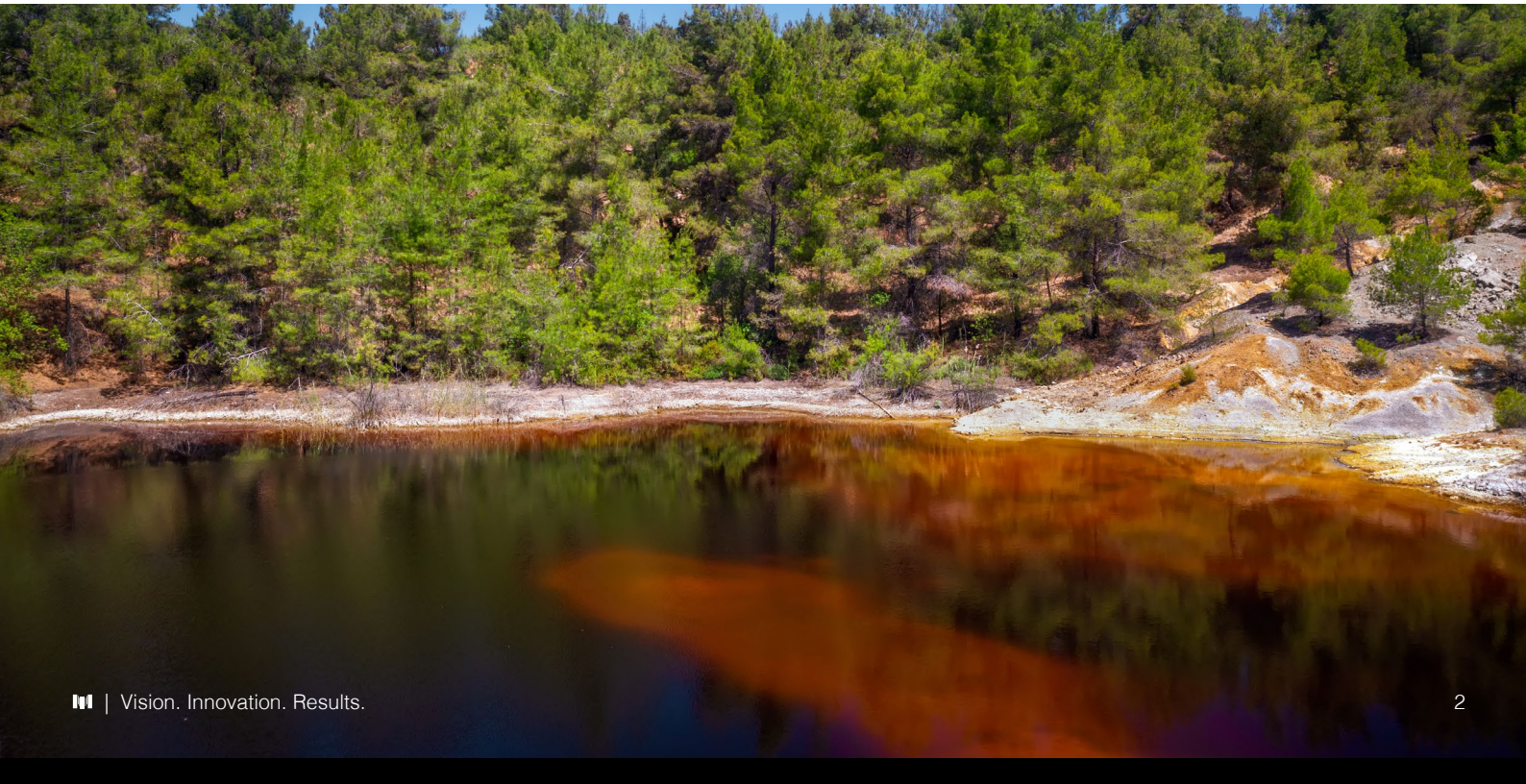
- Water ranging from pH 1.0 to pH 14+.
- Acid water.
- Caustic water.
- Water with high Total Dissolved Solids (TDS).
- Water with high Total Suspended Solids (TSS).

The general rule of thumb is that the performance of Minetek Evaporators is largely unaffected by water quality.

This is because unlike water treatment, in which the various processes are set up to address the constituents within the water but not the water itself. Evaporation affects the water itself, and therefore evaporation is largely 'blind' to the constituents within the water.

It is also essential to understand that, unlike water treatment, the evaporation process takes place outside of the evaporator (i.e., in the air). So, any effects produced by the increased concentration of various constituents within the water do not occur within the Minetek Evaporator itself.

We simply need to be able to pump the water through the evaporator to achieve evaporation.



How do Minetek Water Evaporators process water with high TDS and TSS or varied pH?

Minetek Evaporator nozzles are specifically designed to process solids of up to 4.0mm in diametre. This unique design is a critical factor in longevity, durability, and, ultimately, the performance of the units.

The spiral water fracturing nozzles prevent blockage by having a have a large diameter (approximately 4 mm) and high exit velocity. The action of these nozzles is to ‘pre-fracture’ the water and disperse it before it enters the main air stream. The majority of the fracturing (and the generation of the sub-micro droplets) is achieved by the action of the fan (air stream) on the pre-fractured water. The pre-fracturing action of the spiral fracturing water nozzles increases the efficiency of the fracturing achieved by the fan.

Essentially, we are limited to the solubility of the predominant salt. The material that we are trying to evaporate must be a liquid for the process to work. If the brine is a sodium chloride base, then we can achieve evaporation until we reach the solubility of that material (e.g., 350,000 – 360,000 mg/L).

What maintenance is required when using Water Evaporators to manage challenging water qualities?

For very high TDS brines, it may be required to periodically run a freshwater flush to prevent blockages within the system. This flushing can be achieved manually or automatically. We also can install our Full Stainless Steel Filter System on the inlet of the suction pipe to eliminate any solids from entering the Evaporator.

More information on our strainer can be found on page 6.

Water management case studies – varying water qualities.

Feature Case Study.

Client Challenge.

Our Copper Mine client was looking for alternative methods to reduce the water inventory contaminated by elevated concentrations of acidity, sulphate and high concentration of dissolved metals, mainly copper, cobalt, iron, and aluminium. Soluble metals such as calcium and magnesium are present in high concentration.

Below is an example of the clients' water quality:

- pH 2-3
- Sulphur >2,300 mg/L
- Sulphate >6,900 mg/L
- Al (226 mg/L)
- Co (22.4 mg/L)
- Cu (230 mg/L)
- Fe (60.3 mg/L)
- K (11.5 mg/L)
- Mn (66.8 mg/L)
- Na (44 mg/L)
- Ni (4.12 mg/L)
- Si (8.52)
- Zn (3.46 mg/L)

The client had an existing water treatment system and discharge infrastructure to reduce the stored water levels in accordance with their Environmental Authority and Court Order commitments. The existing treatment facility has the capacity to treat >60ML of pit water each week, achieved using a slaked lime slurry (15%) applied at the inlet of the dam for pH correction and gypsum precipitation for sulphate (and other ions) reduction. The water is contaminated by elevated concentrations of acidity, sulphate and soluble metals (mainly copper, cobalt, aluminium, iron, and manganese) due to surface water run-off through acidic waste rock dumps.

Choosing Minetek.

The client engaged Minetek to determine a more cost-effective and sustainable method of reducing their large inventory of AMD water. Minetek completed a scoping study of various options and technologies and deemed the Evaporator solution was the most cost-effective sustainable approach.

Minetek solution and results.

An evaporation system was designed to withstand the corrosive nature of the site's water and high susceptibility to scale. The system was supplied as 316 stainless steel using Minetek's water atomising technology to minimise scale potential and achieve maximum performance. Minetek commissioned the first stage of the system in 2016 and has exceeded targets set for this system.

Case Studies.

Australian Alumina Refinery.

Application – Red mud pond water reduction.
Models – 16 x 200/100 Galvanised Steel Water Evaporators.
System – Full automated system including EMS.
Capacity – 720m³/hour.
Water quality – Highly caustic, pH 12-14.
Project – Caustic water removal project.
Status – Completed.

Australian Coal Mine.

Application – Pit dewatering.
Models – 6 x 600/300 Galvanised Steel Water Evaporators.
System – Full manual system package.
Capacity – 810m³/hour
Water quality – Neutral pH, run of mine water & accumulated rainfall.
Project – Pit dewatering to recommence operations.
Status – Completed.

Australian Copper Mine.

Application – Legacy pit.
Models – 3 x 400/200 Stainless Steel Water Evaporators.
System – Climate-controlled automated system.
Capacity – 270 m³/hour.
Water quality – Low pH acid water.
Project – Manage pit water levels and reduce the risk of unplanned discharges.
Status – Ongoing.

Full Stainless Steel Filter System.

For further confidence and reduced maintenance of Minetek Evaporator units when managing high TDS or TSS water, Minetek's Full Stainless Steel Filter System is an optional add-on available for all Minetek Evaporator Models.

The Full Stainless Steel Filter System, mounted onto its own skid for ease of installation, is comprised of a duplex filter, switch-over valve, isolation valves, and stainless-steel filter basket. With an orifice size of 2mm, the Filter System catches all particles that would normally block the nozzle rings, thus reducing the maintenance requirements of the Evaporator units.

Features:

- Cast iron or stainless steel body
- Stainless basket with 2mm perforation
- Works with or without actuation
- Able to cleaned without shut down of the system
- Pressure indicators to visually determine if strainer is blinding
- Automated detection and maintenance alarm for blinding (EMS system required)
- Stainless steel isolation valve included.

Phone	1300 963 801 +1 832 390-2732
Email	sales@minetek.com
Head Office	1/1 Civic Ave, Singleton NSW 2230, Australia
Sydney Manufacturing Hub	23 Ash Rd, Prestons NSW 2170, Australia
Perth Operations Hub	6/2 Commerce St, Malaga WA 6090, Australia
USA Office	700 Louisiana Street, Suite 3950, Houston, TX 77002, United States

Vision. Innovation. Results.