

MAXH2O Desalter Technology – Innovative Solution for Saline Brine Minimization

Alex Drak¹, Marco Kerstholt², Gerard van Houwelingen³ and Tomer Efrat⁴

1. *IDE Technologies, Kadima, Israel, Industrial Water Treatment Expert, +972 9 8929835, alexd@ide-tech.com*
2. *Royal HaskoningDHV, Umhlanga, South Africa, Water Treatment Specialist, +27 6 0991 5260, marco.kerstholt@rhdhv.com*
3. *Royal HaskoningDHV, Amersfoort, the Netherlands, Water Treatment Specialist, +31 6 5201 8545, gerard.van.houwelingen@rhdhv.com*
4. *IDE Technologies, Kadima, Israel, Business Development and Product Management Director, +972 9 8929858, tomere@ide-tech.com*

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ABSTRACT

Saline brine, with high dissolved salts content, is a by-product of brackish water and industrial wastewater desalination processes. With the growing demand for water, increasing amounts of brine are produced from the desalination plants, leading to significant adverse impacts on the environment. Effective management of desalination brine is imperative to ensure more efficient disposal and reuse. Sustainable improvement in saline brine management is based on brine minimization, which can be achieved through the recovery of valuable materials such as salts, metals, and chemicals. A recently developed MaxH2O Desalter technology allows the quantity of produced saline brine from brackish water and industrial wastewater desalination plants to be minimized, recovering some of the salts for further reuse. The brine chemistry is the main challenge to minimizing the quantity of produced brine. As the concentration of the brine salts increases, there is an increased risk of desalination process failure due to precipitation of salts on all available surfaces. The recently developed technology, comprising a reverse osmosis (RO) system with an integrated salt precipitation unit, overcomes this limitation. The technology provides a solution for difficult brackish waters and industrial wastewaters and successfully overcomes the different challenges, e.g. scaling by sparingly soluble salts, and organic and bio fouling. The integrated salt precipitation unit

removes only the salts that can harm the desalination process, minimizing the reject brine quantity as much as possible in RO technology. This presentation presents the recent pilot results for four water sources: brackish water brine, industrial water brine, acid mine wastewater and cooling tower blowdown. The results show that with these types of water, the system can reach maximum recovery as governed by osmotic pressure and is no longer limited by water chemistry. In the above case studies, the developed system successfully removed calcium carbonate, silica and calcium sulfate from the brine, maintaining the saturation index of these salts in a range that does not harm the RO membranes. The produced crystals have more than 90% dry solids content, and do not require further sludge dewatering. The technology is a perfect solution for minimizing the amount of saline brine from brackish water and industrial wastewater treatment plants. The significant advantage of this technology is the removal of sparingly soluble salts to the extent that allows increasing the recovery up to the limit of osmotic pressure, while preventing downstream scaling problems in brine pipes and injection wells.