HUBER TECHNOLOGY
WASTE WATER Solutions

HUBER Water Intake Solutions for Desalination Facilities

- Superior quality in design, manufacturing and deployment
- Comprehensive client support throughout the entire life cycle
- Tailor-made solutions for even challenging environments

Increasing water scarcity leads to a growing importance of desalination

Access to clean drinking water has become a growing problem for many countries and populations around the world. For some, fresh water is not available in sufficient quantities, for others quality due to water contamination is a major challenge.

Desalination facilities are frequently used to overcome water scarcity and cover the growing demand for potable water. Desalination is increasingly favoured as a solution for water supply as many countries have direct access to seawater, which represents 97 % of the water on our planet. The installed capacities are expected to further grow rapidly according to water experts.

Desalination plant at Arrecife in Lanzarote.

The right screening technology is key for the successful operation of a desalination facility

Regardless of which desalination technology will be deployed – either reverse osmosis membrane (RO) or thermal desalination including vapor compression (VC), multi-effect distillation (MED) and multi-stage flash distillation (MSF) – seawater has to be mechanically cleaned in a first step. Debris such as seaweed, jellyfish and plastic must be removed first.

HUBER provides unique screening solutions for the mechanical treatment. Our experts develop project-specific solutions choosing from a variety of coarse and fine screens including trash rakes and bar screens as well as travelling band screens.

HUBER screens for seawater applications

Coarse screens:

- HUBER Grab Screen TrashLift (cable-operated)
- HUBER Multi-Rake Bar Screen RakeMax® (with revolving chain)

Fine screens:

- HUBER Band Screen CenterMax® (in-to-out flow pattern)
- HUBER Band Screen DualMax® (out-to-in flow pattern)
- HUBER Band Screen DiscMax® (through-flow pattern)

HUBER Multi-Rake Bar Screen RakeMax®.

HUBER Band Screen DualMax®.

Selecting the right material for specific project requirements

Choosing the right material for the water intake screens is key for reliable and low-maintenance operation of the entire desalination facility. Depending on the specific project conditions, there are several materials at hand:

- Stainless steel AISI 316L that is generally suitable in seawater but requires additional corrosion protection.
- Stainless steel Duplex provides better corrosion resistance, particularly chloride stress corrosion and chloride pitting corrosion, and higher strength than standard stainless steel qualities such as AISI 316L. In few cases it requires cathodic corrosion protection.
- Stainless steel Super Duplex offers superior corrosion resistance and strength. It is seen as the best solution, especially if no metal oxide is acceptable downstream.

Based on our experience, we are in the ideal position to support our clientsin selecting the best-suited materials for their specific project conditions.

Cathodic corrosion protection enhances the durability of screens

Cathodic protection can be achieved either by using sacrificial anodes or by impressed-current systems. Impressed Current Cathodic Protection (ICCP) is a proven system for protecting stainless steel against electrochemical corrosion.

Basic principle: the object to be protected becomes the cathode, which does not corrode. For this purpose, electrons are constantly supplied to the metal via an external current system. The system consists of several reference electrodes and several anodes. The anodes are connected to a power pack and emit the protective current into the conductive water. The protective current reaches almost all surfaces of the protected screen immersed in water.

The reference electrodes measure the electrical protection potential. Based on this data the power pack automatically controls the required power at the anodes. The protective current given through the anodes leads to a change in potential on the surface of the protective project and prevents the corrosion process. Key advantages of cathodic corrosion protection with external current: Relatively large areas and structures are effectively protected, comparatively few anodes are required and the applied voltage adapts to changing environmental conditions.

Corrosion protection can also be achieved using galvanic anodes, the so-called sacrificial anodes. These consist of an electrochemically less noble metal, usually aluminum, zinc or magnesium, which is electrically connected to the protected object through the seawater. It is crucial for effective corrosion protection that the sacrificial anodes are either mounted directly on the object to be protected or directly connected to it via a metal cable.

The base material of the sacrificial anode oxidizes and releases its electrons, which flow to the protected object as a protective current. This acts as a kind of cathode. The sacrificial anode dissolves during the process and protects the screens from corrosion.

Sacrificial anodes must be replaced at the end of their lifetime, typically after two to five years. The main advantages are the relatively low material costs and easy installation. In addition, it requires no power source. In addition, they are suitable for localised protection and less prone to interactions with neighbouring structures. Compared to cathodic corrosion protection with external current, the lack of control and direct measurability is perceived as a disadvantage.

Additional HUBER offering: device for handling jellyfish blooms and significant amount of seaweed

The occurrence of jellyfish blooms or significant amounts of seaweed might represent a challenge for operators in several regions in the world. Jellyfish or seaweed might block screens. Water flows for subsequent processes will be reduced or even stopped resulting in low performance or in worst-case standstill of desalination facilities. In order to keep the water intake flowing HUBER equips the screens for those projects with special rakes or buckets and with the possibility of variable regulation of the discharge speed using a frequency converter.

Typical jellyfish bloom.

Case studie: Desalination facility Adelaide / Australia

In addition to the typical water intake channels, a desalination facility usually comprises pits for discharging debris from the coarse screening and/ or fine screening. This approach has been chosen for the desalination facility in Adelaide/Australia. The plant operator approached HUBER to find a solution to convey the debris from the bottom of the pit sump to a container, clean the small water volumes of the pit and avoid failures of the pumps as result of the debris. Key project preconditions comprised a flow rate of maximum 24 l/s and a perforation of 3 mm.

Our solution: installation of a HUBER Pumping Stations Screen ROTAMAT® RoK4 that automatically cleans the pit water. The screen vertically lifts the screenings, and dewaters and compacts them at the same time. The RoK4 consists of a vertical perforated screen basket and a shafted auger in a vertical tube. The water flows through an inflow connection and a chamber into the screen basket. Within the screen basket the flights of the screw are equipped with wear-resistant brushes for effective cleaning of the screen. As the screenings are gradually lifted by the auger, they are dewatered.

Super Duplex was chosen as the material for the machine to enable low-maintenance operation and superior corrosion resistance. Key benefits of the solution: (1) automatic screening, lifting and compression in a single compact unit, (2) optimal solids retention by means of two-dimensional screening (perforated plate), (3) easy installation into existing structures and (4) low-maintenance operation.

HUBER Pumping Stations Screen ROTAMAT® RoK4 in operation.

HUBER keeps your desalination up and running

Our clients receive comprehensive support for the entire life cycle of the project: design, construction, commissioning, operation and maintenance of the desalination facility.

Results are optimised capital and operation expenditures (CAPEX and OPEX), shorter construction time, space savings and top quality manufacturing for an extended lifetime.

Desalination facility in the Punta Padrones Area, in Caldera City (Atacama)/Chile.

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