Aqseptence Group

Water Processing Solutions

Screening Technology for Water Intakes

Geiger® – Johnson Screens® – Passavant®

Water Intake Technologies

by Geiger®, Johnson Screens® and Passavant®

Aqseptence Group GmbH provides our customers with best practice solutions to enhance their water intake systems. Our custom-designed equipment will optimise your plants' lifecycle costs and minimise the effects on aquatic life.

Raw water, process or cooling water must be cleaned before use. Cleaning systems have to fulfill specific requirements, depending on their source (i.e. rivers, lakes or the sea) and the type of industrial plant in which they will be used. Furthermore, each plant's facilities vary in their requirements. Aqseptence Group GmbH meets these challenges thanks to a variety of flexible solutions and the implementation of the latest manufacturing technology.

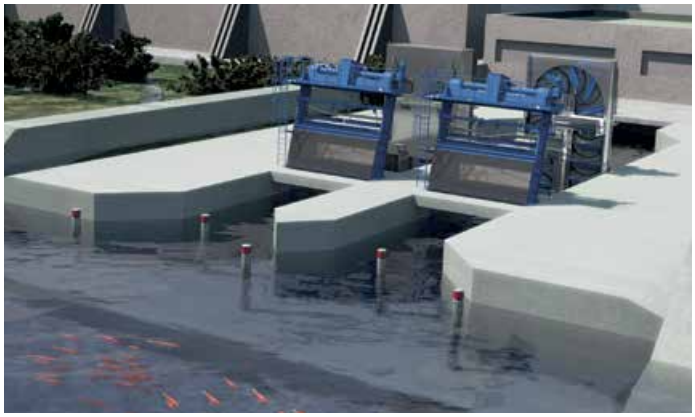
Our environmentally-friendly solutions are used in both open surface water and submerged passive water intakes to deliver debris-free water; for example, cooling water at power plants, process water at industrial sites, raw water at potable water plants, desalination plants and irrigation plants.

The combined experience of Geiger®, Johnson Screens® and Passavant® is unsurpassed, with each brand existing for more than 100 years.Together we have supplied more than 15,000 intake screens worldwide. From small municipal drinking water plants to next generation large-scale power plants, we support our customers in all project phases including conceptual design, assistance with regulatory requirements, computational modelling (if required), equipment supply, commissioning and followup service.

We offer custom-made solutions for open channel and passive water intake systems that include comprehensive consulting services and the optimal coordination of system technology and structures. Furthermore, we custom-design and build sophisticated constructions to suit the particular application area. Our state-of-the art, in-house production ensures that our machines meet the highest quality standards.

Our premium bar and mesh screening machines find their best application when high-grade power units such as condensers and pumps need to be protected from damage by debris and other foreign bodies. Our Johnson Screens® passive intake screens provide a low and even slot velocity whilst operating continuously without any downtime for routine maintenance.

Open Channel Water Intake Systems



Patented MultiDisc® Technology:
Unique and compact zero carry over design.

Johnson Offshore Intake Systems™ (JOIS™)

Patented internal flow modifier:
High efficiency and low costs.

Our product range includes:

Coarse Screening Machines

Aqseptence Group GmbH supplies a complete range of bar raking machines for both coarse and fine screening in the context of open channel water intakes.

We differentiate between coarse and fine screening, depending on the width of the bar spacing and the type of debris. Coarse screening is the first stage of cleaning for the removal of large or bulky debris using robust bar screens with bar spacing of 30 - 100 mm. Our bar screen solutions can also be used for fine screening (as a 2nd stage) with narrower bar spacing of 2 - 30 mm, for example, in case of high levels of seasonal debris.

The advantages of our bar screening machines are:

- Fully automatic cleaning
- Customised design and manufacturing depending on the flow conditions, debris type and material requirements
- A design operating life of around 35 years

Geiger® coarse screening machines are precise, highly reliable, low maintenance and highly durable. The machines undergo constant technical updates and re-design procedures, standards that are maintained thanks to our continuous research and development activities.

Aqseptence Group GmbH has its finger on the pulse when it comes to using state-of-the-art-technology, and is always aware of innovative ideas for products and projects, helping to provide the best solutions for the customer.

We offer the following coarse screening machines, adapted to meet the customer's specific requirements:

- High-Load Revolving Chain Screens
- Liftable Bar Racks
- Cable-Operated Grab Cleaners with Bar Screens – Stationary and Traversing
- Claw Screens and Climber Screens

Geiger® Claw Screen

Geiger® Cable-Operated Grab Cleaner

Geiger® High-Capacity Revolving Chain Screen

Fine Screening Machines

As the last cleaning stage in the water intake process, efficient fine screening using fine screening machines is essential to protect pumps, condenser tubes and other critical equipment.

For decades, Geiger® fine screening machines have been successfully implemented on a global scale in the water intake structures of power plants, petro-chemical plants, desalination, LNG, pulp & paper, potable water, irrigation and other processing plants. One of our main features is the high throughput capacity with reduced channel sizes.

Looking for a completely new concept and in view of modern requirements, we developed the re-nowned Geiger MultiDisc® screen which has been successfully installed hundreds of times worldwide.

The advantages of Geiger MultiDisc® are:

- Its compact design allowing significant cost reductions in civil structure volume
- Its fast and simple plug-in installation
- Its low operating costs:
  a) Only one maintenance-friendly bar chain
  b) Easy maintenance; mesh panels can be changed at operator's floor level (no need for channel dewatering)
- Lower head loss: water only passes through the screen once
- Optional fish protection (EPA clean Water act – section 316b pre-approved technology) – intensive and efficient cleaning of the mesh panels
- Zero carry-over of debris to the clean water side
- Shorter channels

Executed projects have proven that the Geiger Multi-Disc® can be retrofitted into existing water intake structures within 24 hours, including removal of the old through-flow band screen, installation of the Geiger MultiDisc® and commissioning. Both the Geiger MultiDisc® and our Travelling Band screens are available project-specifically with plastic or stainless steel mesh ranging from 0.2 – 10 mm. Furthermore, for special applications we offer micro drum screens with a mesh size down to 15 microns.

We offer the following fine screening machines, adapted to meet the customer's specific requirements:

- Centre-Flow Travelling Band Screens (In-to-Out Flow Pattern)
- Dual-Flow Travelling Band Screens (Out-to-In Flow Pattern)
- MultiDisc® Screens (Through-Flow Pattern)
- High-Capacity Drum Screens

Geiger® Centre-Flow Travelling Band Screen

Geiger® Travelling Band Screens

Geiger MultiDisc® Travelling Water Screening Machines

Geiger® High-Capacity Drum Screens

Johnson Offshore Intake Systems™

(JOIS™)

Johnson Screens® high capacity passive intake screens provide uninterrupted water withdrawal from lakes, rivers and oceans.

The Johnson Screens® high capacity passive intake screens are constructed using non-plugging VeeWire® with a patented internal flow modifier that creates a nearly uniform low velocity flow through the entire screen surface. This significantly reduces impingement and entrainment of debris while protecting aquatic life. Passive screens are designed to meet regulatory requirements for a maximum slot velocity of 0.15 m/s which is the maximum velocity at which a juvenile fish can turn around, swim away and not be impinged onto a passive screen. This, combined with a typical slot width range of 2 - 10 mm will determine the screen sizing. The large open area and low velocities result in a very low headloss.

Key Features

- Low capital costs and no moving parts, and low maintenance needs
- Environmentally-friendly – this approach meets the EPA's 316b regulations for fish protection
- No waste stream – there is no debris brought to the surface to be handled or disposed of
- Easy cleaning – with a periodic blast of compressed air using our Hydroburst™ system
- Non-plugging Vee-Wire®
- Three standard configurations – drum, tee and half screens
- Selection of materials available from 304 and 316L stainless steel for fresh water to Duplex and Super Duplex for seawater applications and Z-alloy (CuNi) for repelling zebra mussel attachment and anti-bio fouling
- Dual-flow modifier – provides low and even slot velocity (CFD modelling is available on demand)

Half Intake Screens

As water demands increase for cities, towns and industry, shallow water resources previously hard to withdraw from due to their lack of depth, have become a more viable option. Our patented half screen has all the same attributes (low slot velocity, Hydroburst™ option, VeeWire®, etc) as the standard passive intake screens but can operate in a much lower depth of water. Our standard passive screens require approximately half a diameter clearance around the screen. The half screen sits flat on the bottom and only needs the top clearance.

Hydroburst™ Air-Backwash System

With time, general debris will gather on the outer screen surface and will need periodic cleaning to keep the screen functioning continuously and properly. Our Hydroburst™ system offers an efficient method of regular cleaning without having to send divers in to clean the screens. Our Hydroburst™ system is designed to deliver a sufficient volume of air in 3 - 5 seconds time – a real solid blast of air that has proven to work in all types of applications and conditions. This volume of air comes out from the bottom of the screen, and as it rises and expands, grabs and carries impinged debris away from the screen surface, returning the screen to a clean operating condition. Our application engineers evaluate screen size, depth and distance away in order to deliver the correct amount of air. Systems can be as basic as operating a manual valve, a programmable timer system or to a PLC system that communicates to a central data control system/SCADA system for control.

Johnson Screens® Passive Intake Screen (half stainless steel (left side), half Z-Alloy (CuNi) (right side))

Johnson Screens® Half Intake Screen

Johnson Offshore Intake Systems™ (JOIS™) Installation

Hydroburst™ with Surface Blast

Special Solutions

Cathodic corrosion protection and fish protection are key issues in the planning and operation of cooling water intake structures at seas and oceans, for hydropower plants and river pumping stations.

The EU flora-fauna-habitat guidelines and the EPA CWA Rule 316b are the basis for establishing the necessary protection measures. Geiger® and Johnson Screens® fish protection concepts are the result of the latest developments in mechanical and electrical engineering combined with decades of experience in the field of fish protection.

Our fish protection concept covers the following:

- Electrical fish-repelling systems as behavioural barriers (particularly on rivers and lakes)
- Meets environmentally-friendly guidelines
- Automatic fish return systems for bar and fine screening machines
- Immobilisation of fish
- The Geiger MultiDisc® Band Screen is particularly enviromentally-friendly with specially shaped fish buckets
- Our technology is preapproved in accordance with the EPA 316b CWA

Shut Off Devices

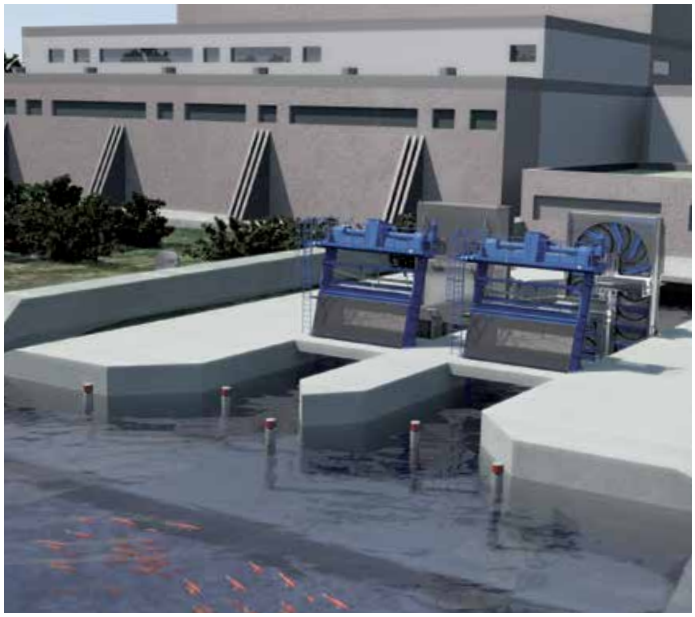
In water intake systems, Aqseptence Group GmbH's stop logs are tailormade and installed according to on-site requirements. They provide shutoff services for maintenance and revision work on the machines. Deluge valves enable pressure equalisation for easy lifting. Our stop logs are custom built to withstand the rigours of different plants. Stop logs are of welded construction, manufactured from steel plate and Feature-rolled steel sections. A preformed neoprene seal is fitted around the outer edge of the gate to ensure reliable sealing. Our stop logs have valves through which the isolated chambers are flooded. Hence, the pressure is balanced and the stop logs can be withdrawn easily. Operators recommend our lifting beams as the valves are operated automatically, meaning there is no need for additional equipment such as spindles.

Cathodic Corrosion Protection

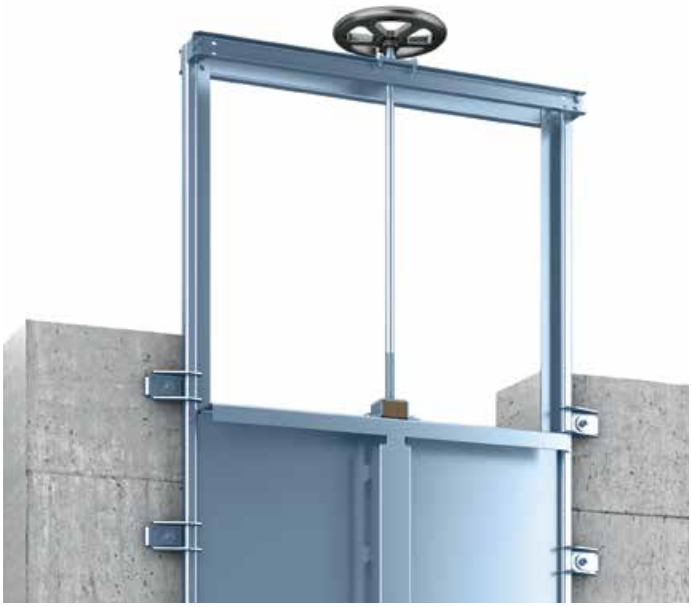
To ensure continuous reliable operation and value preservation, we highly recommend supplementing careful and regular maintenance with a special plant protection system, particularly when the equipment is installed in aggressive environments. Our cathodic corrosion protection systems are the most efficient method to protect steel equipment from natural corrosion in aggressive environments such as seawater. Aqseptence Group GmbH has decades of expertise in this field and holds patents for the protection of machines in saltwater in order to secure the plant's longterm economic value. These systems preferably use impressed current and have been successfully installed and operating in 100s of desalination and power plants for decades.

Geiger® Fish Repelling System

Geiger® Stop Log with Lifting Beam



Two Channel Water Intake with Geiger® Fish Repelling and Geiger® Fish Return System



Passavant® Weir Sluice Gate

A Team of Specialists for Individual Tasks

Aqseptence Group GmbH provides a wide range of services for the whole service life of a plant. These include manufacturing and supplying spare parts, fulfilling maintenance contracts and making plant revisions, as well as adapting equipment to meet modified site conditions.

We also modernize plants, for example, by supplying lubrication-free chains and modern materials, as well as modifying existing guide ways with wear ledges. Dedicated and highly specialised teams of engineers and technicians ensure that the customers' benefits are maximised, so that they profit from the know-how we have gained during decades of experience. We endeavor to solve even the most complex challenges with professional engineering – for both passive and open channel water intake, complemented by a variety of special features.

Systematic Quality Control
The systematic approach of the project teams ensures that each project is a success from start to finish. Expert advice, the choice of the appropriate technology, the adaptation of the systems to harmonise with the civil structures, and the machines' design and manufacturing are subject to stringent controls performed in accordance with the highest quality and safety standards (for example, SCC**). Complete, detailed documentation and our spare parts service, including in-house design and manufacturing according to the latest technologies, ensure a long service-life and trouble-free operation for your application area.

Service
Our strong commitment to providing high-quality products and professional customer service is reflected in longterm partnerships with customers all over the world. Aqseptence Group GmbH offers a qualified service upon delivery onsite. Our supervisor and installation teams are made up of committed and internationally experienced specialists, dedicated to providing installation of equipment, commissioning and training of operating personnel. The aftersales support team assists the customers by giving competent advice with regard to operation and maintenance work. Aqseptence Group GmbH's product range is well-known for its high quality and long service life. Our mission is to provide a fast, most experienced and effective response to all our customers.

** Safety Certificate Contractors

Systematic Quality Control

Service

A Selection of References

Power Plant Moorburg, Germany
12 MultiDisc® Screens, 6 Cable-Operated grab cleaners, Stop Logs, Fish Protection Technology

Nuclear Power Plant DC Cook, USA
15 MultiDisc® Screens, operating + control systems

RO-Desalination Plant Al Taweelah, UAE
24 x T54 316L Passive Intake Screens

Power Plant Al Taweelah "A", UAE
12 Cable-Operated Grab Cleaners, 12 Travelling Band Screens, operating + control systems, Stop Logs, Cathodic Corrosion Protection System, accessories

Desalination Plant: Tuaspring, Singapore
3 Stop Logs, 3 Travelling Band Screens, 3 Cable-Operated Grab Cleaners, Cathodic Corrosion Protection System

Industrial Intake Office Chiller System, Hudson River, USA
2 x T Passive Intake Screens, Hydroburst System

Power Plant Sousse, Tunisia
2 Cable-Operated Grab Cleaners, operating + control systems, 2 Travelling Band Screens, Cathodic Corrosion Protection System

Power Plant Qurayyah, Kingdom of Saudi Arabia
36 Revolving Chain Screens, specially designed equipment for the removal of jellyfish

Nuclear Power Plant Brokdorf, Germany
8 Cable-Operated Grab Cleaners, 8 Revolving Chain Screens,Cathodic Corrosion Protection System

Power Plant Atacama, Chile
4 Cable-Operated Grab Cleaners, Stop Logs, 4 Travelling Band Screens, Cathodic Corrosion Protection System

Mining Plant, Sumbawa, Indonesia
4 MultiDisc® screens, Cathodic Corrosion Protection System

Power Plant Zawia, Libya
4 Cable-Operated Grab Cleaners, 4 Travelling Band Screens,2 sand removal units, Cathodic Corrosion Protection System

Municipal Intake Clinton TN, USA
Half T-Intake Screen on guide rail, Hydroburst™ System

Power Plant, Diemen, Netherlands
2 Travelling Band Screens, Fish Protection System, Cable-Operated Grab Cleaner, 2 Pen Stocks

Power Plant Milwaukee WI, USA
24 x T96 Zalloy Passive Intake Screens, Hydroburst™ System

Power Plant Song Hau 1, Vietnam
1 Traversing Cable-Operated Grab Cleaner with Bar Screen, 4 Travelling Band Screens, Cathodic Corrosion Protection System

Thermal Power Plant Verchnetagilsk, Russia
2 MultiDisc® Screens

Desalination Plant Barka 4, Oman
3 Cable-Operated Rake Cleaners, 3 MultiDisc® Screens, Cathodic Corrosion Protection System

Johnson Screens® Passive Intake Installation: Drinking Water Plant, in South Carolina, USA

GKM 9 Power Plant, Mannheim, Germany

DC Cook Nuclear Power Plant, USA

Aqseptence Group GmbH
Division Water Processing Solutions
Water Intake Systems

Hardeckstrasse 3
76185 Karlsruhe
Germany
Phone +49 721 5001-0
info.geiger@aqseptence.com

www.aqseptence.com