

# Wastewater Treatment and Reuse

**Water Processing Solutions** 

Passavant Registrations

Passavant Registrations

Reiger Registrations

Passavant Registrations

Reiger Registrations

Noggerath Registrations

Service

Future

A brand of Aqseptence Group

# WE OPTIMISE WASTEWATER TO PERFECTION



# Competence and vision

Intelligent solutions to meet the challenges of the future – the world is changing faster than ever before. Cities are growing and populations continue to develop. The climate is changing. Everything we do today will have repercussions in the future. That's why it has become even more important to use resources wisely. Water and wastewater treatment technology is about finding a balance between water and energy on the one hand, and economic efficiency and profitability on the other.

The success story of Passavant-Geiger is based on the skills and commitment of its employees, the company's extensive experience and its own unique approach to finding solutions. We provide customised solutions for a wide range of projects, including renovation work and new construction, individual components and system solutions, for municipal operators and industrial companies. We treat each job individually and, in doing so, make sure that all local, budgetary and environmental conditions are fulfilled in the best and most efficient way. With a large number of benchmark projects worldwide and a broad portfolio of innovative machines manufactured in-house, we are uniquely positioned to meet your specific requirements and challenges.

Our low-maintenance, versatile and flexible solutions, supplied under the long-standing brands Passavant®, Geiger® and Noggerath®, cover the entire clarification and treatment process, as well as water extraction.

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# Wastewater pumping stations

As the market leader in mechanical equipment for large and deep pumping stations for sewer and stormwater networks, Passavant-Geiger supplies high-quality penstocks, stop plates, screening systems and their associated controls. Our goal is to protect pumps and other downstream installations, such as heat exchangers, from the carryover of debris. Our products meet the highest quality, certification and structural requirements and guarantee safety and reliability. Our screening and shut-off devices are manufactured in Aarbergen (Hessen, Germany), assembled as far as technically reasonable prior to delivery and subjected to factory acceptance tests with trial runs.

#### Our solutions

- Coarse and fine screens
- Shut-off devices and stormwater overflow sieves

# Coarse and fine screens

For deep inlet channels or pumping stations, in which large quantities of grit and debris are to be expected, Passavant-Geiger supplies triple cable-operated multi-rake bar screens. Ideal for removing very bulky flotsam and sedimented mineral substances such as gravel and stones, the robust design offers a high level of operational safety. An intelligent Programmable Logic Controller (PLC) makes it possible to remove even extremely bulky screenings from any height by repeating the cleaning cycle as often as required.

- Eight different screening systems for any field of application
- Individual attention to customerspecific requirements and circumstances thanks to a wide range of products
- Seamless integration into existing systems

You can find more information on our website



Coarse and fine screens 3



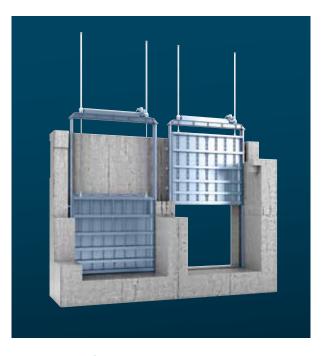
# Shut-off devices and stormwater overflow screens

Passavant® Shut-off devices play a central role in shutting off, regulating and controlling water and wastewater flows in drainage systems. The Shut-off devices not only help protect against flooding and surface water, but also fulfil safety-related functions to protect people, buildings and infrastructure in areas at risk. Thanks to the use of breakthrough technologies in construction, dimensioning, production, assembly, commissioning and customer service, we can guarantee that our products, systems and solutions fulfil the required standards (DIN 19569-4 and DIN 19704-1-3 in Germany and AWWA/C561-14 in the USA) and in many cases even surpass these standards.

- Shut-off systems up to dimensions of 7×7 m
- Highly resilient stop plates and penstocks for shutting off channels and regulating flows
- Suitable for a wide range of dimensions and water pressures
- Optimised welded construction for long-lasting, low-maintenance use

You can find more information on our website





#### Passavant® Penstocks

The 4-sided sealed penstocks are suitable for both flow directions and are available in dimensions ranging from  $200 \times 200$  mm to  $7,000 \times 7,000$  mm and pressures of up to 5 bar (50 m WC).



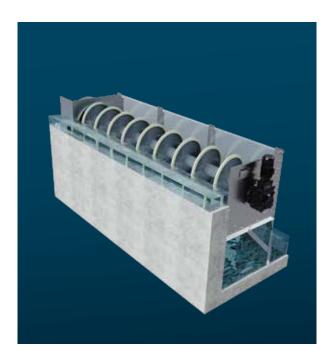
#### Passavant® Stop Plates

The 3-sided or 4-sided sealed Shut-off devices are suitable for one flow direction. Single or multi-part design. Operated by hook tackle (picture) or crane eyes.



#### Passavant® Sluice Gates

Extremely resilient, even with hard and bulky contents in the wastewater: Passavant® Sluice Gates are available as a cost-effective standard design or as a customised design.



#### Noggerath® Overflow Screen OVF

Reliable separation and filtration of solids in stormwater overflows/mixed water restriction channels with automatic forced cleaning of the screen surface.



# Mechanical pre-treatment

The reliable separation of solids from municipal or industrial wastewater is of central importance for every sewage treatment plant. That's why Passavant-Geiger offers machine solutions, which can be adapted to suit the relevant requirements and conditions in the best possible way.

#### Our solutions

- Coarse and fine screens
- Fine sieving
- Screenings handling and grit treatment
- Septage/grit receiving stations and combi units

# Coarse and fine screens

The first stage of mechanical pre-treatment is not just about providing protection it must also cope with a wide variety of requirements, which may vary according to the time of year and the inlet situation. The customised coarse screening systems available under our traditional quality brands Passavant®, Geiger® and Noggerath® are known for their durability and high level of flexibility during use. The individual design of the screen/sieve allows high separation capacities to be achieved and even coarse or bulky screenings to be reliably removed in the inlet area of sewage treatment plants. In addition, our coarse screens can also be used as fine screening machines thanks to the choice of gap widths.

- Reliable protection of all downstream cleaning processes thanks to the secure retention of coarse particles
- Fine screening with tooth gap widths of up to 3 mm
- Very high screening discharge
- Simple and rapid assembly thanks to stand-alone machine design
- Low loss of pressure thanks to various screening bar profiles optimised to suit flow conditions

You can find more information on our website

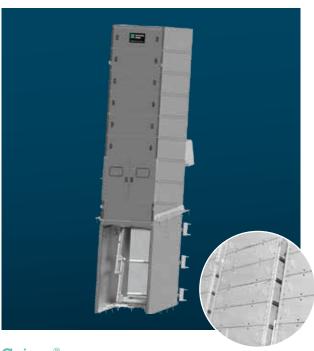


Coarse and fine screens 7



Passavant® Multi-Rake Bar Screen KUR/KUR-C

The KUR product family combines quality, economic efficiency and outstanding cleaning performance. Depending on installation type, KUR-D, KUR-C or KUR-HD may be used.



Geiger® Climber Screen KRC

Used for coarse or fine cleaning, the climber screen is continually improved to ensure efficient, low-maintenance operation as a front- or back-raked screen.



Passavant® Multi-Rake Bar Screen KUR-S

With proven process technology, this low-maintenance, low-wear machine has proven itself in German sewage plants, especially the KUR-S with swivel chain assembly.



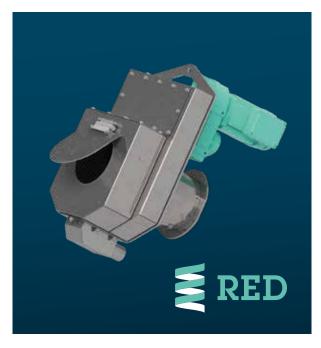
Noggerath® Step Screen PSS

Further developed to enhance functionality, operational reliability, stability and ease of maintenance, this screen is available as a channel version or container version.

### Fine sieving

Following on from the coarse screening phase, finer particles must be removed from the wastewater. Hair, fibres, sanitary products and paper are safely and reliably filtered and recycled where appropriate. To ensure a safe and efficient screening process, Passavant-Geiger offers a wide portfolio of fine sieves and screens to fulfil individual requirements. Thanks to their small mesh openings and screening gaps, they are ideally suited to separating fine particles and thus preparing and protecting downstream preparation phases. In addition, many of the extracted residual materials from industrial applications can often be usefully reintroduced into the cycle.

- Simple integration into existing systems
- Stabilisation of operational processes
- Long service life and high availability thanks to low-maintenance and low-wear operation
- Ultra-fine sieving prior to treatment in membrane plants, particularly with the Noggerath® Centre-Flo™ CF and Noggerath® Rotary Drum Screen RSI-DD-RED and RSH-I-F



#### Noggerath® Radial Eco Drive RED

The patented global innovation: the world's first drive on pulling discharge and conveying spirals with axially free discharge guarantees a discharge area without any blockage and a high level of safety.

Advantages: no blockages in the drive elements and discharge area, adjustable back pressure flap to optimise dewatering and sieving, as well as the transport and dewatering of screenings in a single machine (NSI, RSI-DD) and optional screening washout. Retrofittable to existing screening machines with spirals.

You can find more information on our website



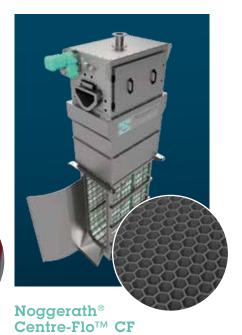
Fine sieving



Proven product technology for fine wastewater screening in a spiral movement. Fine screening, conveyance, compacting and discharge in one system – NSI-T in-tank version available.



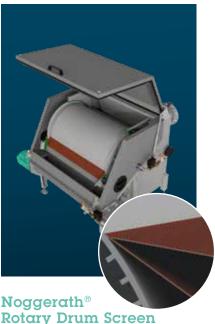
Proven double drive (DD) concept: the screen drum and conveyor are driven independently. Our RED drive system guarantees blockage-free discharge.



Fine and ultra-fine screening for municipal and industrial wastewater applications for the efficient protection of downstream processes with the best capture rates and increased hydraulic capacity.

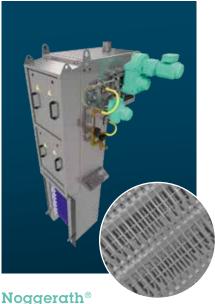


Separation and discharge of solids and particles from a liquid phase for disposal or, where appropriate, for recycling.



Rotary Drum Screen
RSH-E
The religible continuous

The reliable, continuously operating screening system for separating floating, greasy and sticky solids. Proven in municipal and industrial use.



Continuous Belt Screen
BS

The cost-effective and spacesaving screening solution – robust, durable and flexible; established in municipal and industrial use for 35+ years.

## Screenings handling and grit treatment

The screenings handling involves washing soluble organic substances out of the screenings using special, sophisticated washing systems. This is followed by a mechanical dewatering process to reduce the water content and the weight.

Many of the materials produced during coarse and fine screening are hygienically critical waste that often has to be disposed of at higher costs. High water content and organic materials, as well as odour formation in screenings, require the use of special washing systems beforehand. The water content and organic share in the grit from sewage treatment plants are reduced using grit separators and grit washers. Both make a major contribution to cost-efficiency – as well as playing an active role in protecting the environment.

- Weight reduction of up to 80% in the screening process (dry substance content of up to 47%)
- Compact dimensions, particularly robust, long service life and low maintenance requirements
- Flexible use, highly efficient and therefore cost-effective

You can find more information on our website





Noggerath® Wash Press NWP/Screenings Press NSP

The Noggerath® Wash Press NWP and Screenings Press NSP have proven their performance capabilities worldwide and can easily be integrated into existing facilities.



Noggerath® Spiral Conveyor SC

The long-lasting solution for municipal sewage treatment plants as well as industrial plants: quick and easy to maintain thanks to shaftless spiral. Available in lengths of up to 30 m.



#### Noggerath® Grit Washer GWC

Environmentally friendly disposal, massive reduction in the quantity of residual grit to be disposed of, lower transport costs, improved gas production in sludge digestion.



#### Noggerath® Grit Classifier GS

Excellent separation results in the separation of heavy substances from various industrial process water circuits.



### Septage/ grit receiving stations and combi units

Noggerath® Septage Receiving Stations are the best option for the discharge of faecal sludge from cesspools or septic tanks. They can also be used for receiving industrial wastewater or for screening sludge.

Our solutions for the treatment of matter from grit traps and sewer deposits make it possible to transform today's septic waste into tomorrow's hygienically safe raw materials.

- Customised design for different media, catchment areas and recycling methods thanks to a wide variety of design and process engineering options
- Significant references worldwide in a wide range of climate zones in combination systems and grit washing plants, with well over 500 machines in use worldwide



Noggerath®
Compact Combi Unit TOP/TOP-F

Complete mechanical pre-treatment for municipal or industrial wastewater treatment plants in the form of a single, compact contained unit.

You can find more information on our website





#### Noggerath® Septage Receiving Station RBS-SRS-RED

The compact system for automatic wastewater processing: proven double drive concept without bearings and without a fixed swivel arm in the inlet area.



#### Noggerath® Septage Receiving Station NSI-SRS-RED

The robust and versatile station for receiving faecal sludge from tankers is also used for receiving industrial wastewater or for sludge screening.

#### Grit receiving stations



#### Septage receiving stations



# Energy and process efficiency

A key feature of biological water treatment plants is the aeration tanks with their aeration equipment. As well as all the classic requirements, modern wastewater treatment plants also expect to meet current standards such as primary sludge extraction and the protection of membranes. In any case, the efficient automation of biological and chemical wastewater processing guarantees stable and energy-efficient wastewater treatment.

#### Our solutions

- Preliminary screening
- Aeration

### Preliminary screening prior to biological wastewater treatment

While only sedimentary and floating substances are separated in primary clarifiers, pre-screening also enables the retention of suspended particles and impurities. The main advantage of the CarbonExtract® system is that it features interchangeable screening panels, allowing the mesh size to be changed. This enables flexible elimination rates and different hydraulic performance capabilities. A retrospective response can therefore be made to changes in inflow conditions or downstream processes. For example, the ratio of nitrogen to carbon can be changed.

- Almost complete removal of contaminants such as hair, fibres, oils, fats and other organic impurities
- Reduction in subsequent cleaning processes and increased operational reliability
- Primary sludge extraction can be adjusted to changing requirements



Preliminary screening 15



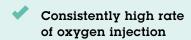
Noggerath® Rotary Drum Screen RSH- MG (container version)

The free-standing Noggerath® Rotary Drum Screen RSH-MG (MicroGiant) is installed in stainless steel housing. The wastewater is pumped into the system (pump-to-pump system).



#### **Aeration**

Biological treatment takes place with the help of microorganisms, which absorb dissolved substances and convert them. Aeration systems play an important role here, as they create an oxygen-rich environment and ensure that sludge and water are mixed. These systems must satisfy a range of requirements. Passavant-Geiger supplies solutions that guarantee a high level of process flexibility. Wastewater plants in tourist areas or for industrial applications have a particular set of requirements, which differ from those of standard municipal wastewater treatment facilities. Our Bioflex tube diffuser or Roeflex disc diffuser are suitable for fine bubble aeration. The Mammutrotor surface aerator is available for use in concrete basins or wastewater ponds.



- Robust and resilient design
- Flexible adaptability to specific requirements

You can find more information on our website





Passavant®
Surface Brush Aerator Mammutrotor®

The Passavant® Surface Brush Aerator Mammutrotor® is known worldwide for cost-effective and reliable surface aeration and has been successfully installed in over 8,600 treatment plants. The surface aerator offers a universal solution, which has been especially developed for aeration, circulation and stir mixing processes. The system's outstanding operational reliability thanks to its particularly robust construction offers a clear advantage over other aeration technologies for wastewater with high levels of lime, solids or warm wastewater, for example from industrial processes.



# Advanced wastewater treatment

In recent decades, residues from products used in the pharmaceutical, pesticide, cosmetics, household and textile industries have become increasingly problematic for our ecosystem. These substances, often referred to as 'trace substances' or 'micropollutants', enter our sewage treatment plants via industrial and household wastewater disposal, can be found in our water and soil, and finally end up in our food chain.

#### Our solutions

- Adaptive inlet system for secondary clarifiers
- Elimination of trace substances

# Adaptive inlet system for secondary clarifiers

Increased demands placed on wastewater treatment plants, such as increased inflow and higher requirements placed on effluent quality, often cannot be met with existing wastewater treatment facilities. However, the expansion of a plant is very expensive, requires a lot of space and often has to meet strict environmental regulations. So instead of expansion, a better solution is the optimization of existing clarifiers. The Passavant® hydrograv® Adapt System is an innovative, state-of-the-art concept developed by Passavant-Geiger to make secondary clarification more efficient.

- Improved phosphorus elimination < 0.2–0.3 mg P/l achievable and fulfilment of the EU UWWTD directive
- Allows (sludge blanket) filtration inside the existing tank, additional filtration downstream is often unnecessary
- Capacity increase and resilience against storm events
- AFS concentrations below 3 mg/l achievable
- Customised solutions thanks to hundreds of individual CFD simulations

You can find more information on our website





#### Passavant® hydrograv® Adapt System

The patented Passavant® hydrograv® Adapt System ensures that the water flows as calmly as possible into the settling tank entering the system from the sludge blanket level. Consequently sludge overflow and floc discharge—typical problems of secondary clarifier operation—can be consistently avoided—leading to a significant increase in the capacity of the system. Therefore no additional secondary clarifiers need to be added to the existing system.

In practice, an intelligent digital control system continuously adjusts the inlet system to constantly changing sludge levels, taking the height and size of the outlet slots into account. In this way, the effluent always enters the sludge bed at the optimal speed and correct depth. Turbulence in the clear water is thus minimised and the entrainment of already sedimented particles is significantly reduced.

Advanced cleaning stages (UV, ozone, active carbon treatment, etc.) for the treatment of wastewater are more effective and can be carried out on a smaller scale, if quantities of solids have already been reduced through optimal secondary clarification.



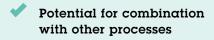


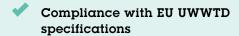
# Elimination of trace substances

Concentrations of micropollutants in water often exceed statutory environmental quality standards and largely fail to meet the requirements for achieving 'good chemical status'. This is because mechanical and biological cleaning processes used in wastewater treatment plants are not sufficient to remove various trace elements from the wastewater. The introduction of advanced wastewater treatment processes (quarternary treatment) is mainly applicable for municipal wastewater treatment plants, as well as in smaller wastewater treatment facilities that discharge into sensitive waters.

The most frequently used form of trace element elimination is treatment with powdered activated carbon (PAC) or granulated active carbon (GAC). For both variants, the effective elimination of solids is an important part of the treatment concept. Easy-maintenance and space-saving solutions are also crucial for integration into plant operations. Thanks to our comprehensive portfolio, we offer numerous options to suit individual requirements.

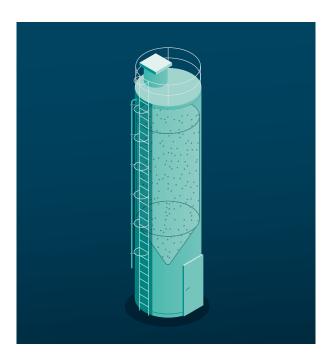






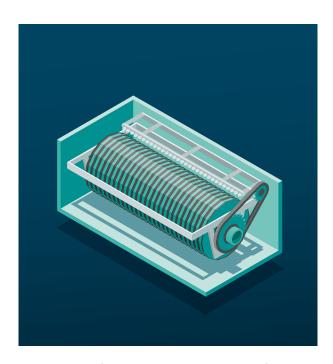
You can find more information on our website





Passavant®
Activated Carbon Dosing PAC

PAC processes deliver broad-spectrum action and fast reaction kinetics and require only little space depending on the dosing point.



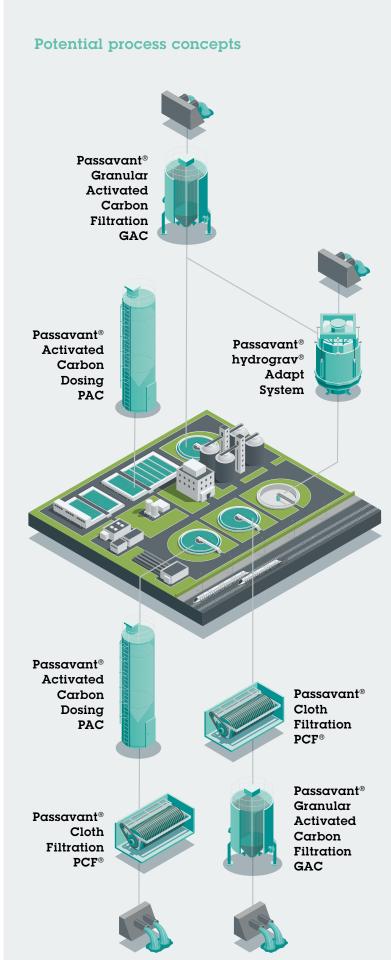
Passavant® Cloth Filtration PCF®

Cloth filtration allows the concentration of filterable substances to be reduced, making it easier for the subsequent GAC filter to do its job. Microplastics and/or previously dosed PAC can also be separated.



# Passavant® Granular Activated Carbon Filtration GAC

The continuously operating filter system with horizontal flow direction, in combination with the granular activated carbon filter, removes micropollutants effectively from wastewater. The patented horizontal flow means the system needs less space than standard vertical filtration processes.



## Service

Your satisfaction and operational safety are our main concerns. By achieving high quality in our production and service facilities, we can ensure you benefit from sustainable functionality, efficiency, low costs and safety. Whether you require installation or maintenance services, replacement parts or repairs, we deliver professional advice and deal with the cause of the problem, even for systems made by other manufacturers.

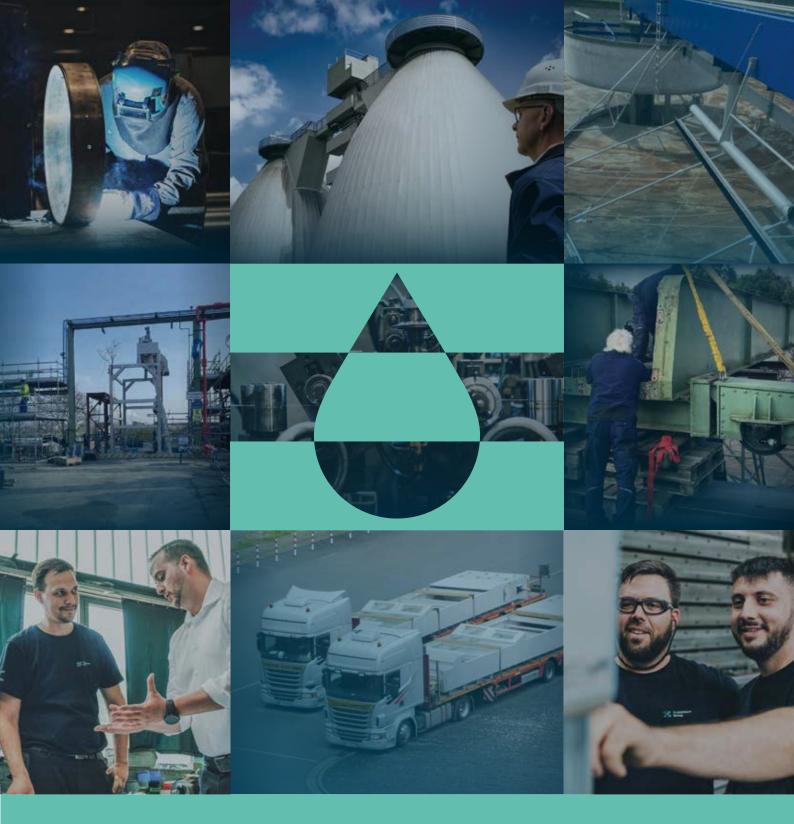
We also offer a wide range of special and replacement parts developed in Germany and under strict controls, carrying out over 4,000 installation jobs each year.

#### Our services

Disruptions in operations and production or machine breakdowns can be annoying and costly. That's why our service team works over a wide area to keep downtimes to a minimum. Replacement parts or service visits can be requested around the clock.

- Replacement and wear parts from our own production facilities
- ✓ Advice and customer service
- Maintenance and refurbishment
- Servicing/preventive maintenance
- Retrofit of machinery (even machines made by other manufacturers)
- Modernisation and upgrade of operational safety for automation and plant networks
- Remote maintenance/access to machines and systems via a secure VPN connection





## 24/7 customer service hotline

Phone: +49 (0)6120 28 2222

Email: service@passavant-geiger.com

# Intelligent solutions for the challenges of the future

#### Case studies and references

Planned, tested, commissioned: for more than 125 years, Passavant-Geiger has set international standards for modern and future-oriented wastewater technology. Our corporate philosophy is based on innovation and investment security. With countless references and case studies from Germany and abroad, we can back up this claim at any time.

#### Sewage treatment plant

#### Hamburg, Germany

- 5 Passavant® Coarse Screens KUR-C
- 5 Passavant® Fine Screens KUR-C
- 10 Noggerath® Wash Presses NWP
- 10 penstocks
- 6 sluice gates
- 13 stop plates
- Various air ducts and conveyor systems

#### Sewage treatment plant

#### Gänserndorf, Austria

6 Passavant® Surface Aerator
 Mammutrotor® incl. guide baffle
 and brake shield

#### Sewage treatment plant

#### Thu Dau Mot, Vietnam

- 2 Noggerath® Centre-Flo™ CF
- 1 Noggerath® Launder system
- 2 Noggerath® Screenings Presses NSP

#### Sewage treatment plant

#### Niedernhausen, Germany

 Replacement of scrapers: the old, solid rubber-tyred running gear was dismantled and replaced with new, easy-maintenance stainless steel running gear with rail rollers and pinions.

#### Sewage treatment plant

#### Geneva, Switzerland

■ 4 Geiger® Fine Screens KUR

#### Südzucker factory

#### Ochsenfurt, Germany

 4 Passavant® Surface Brush Aerators Mammutrotor®

#### Sewage treatment plant

#### Krumbach, Germany

- 1 Noggerath® Continuous Belt Screen BS
- 1 Noggerath® Wash Press NWP
- 1 Noggerath® Grit Washer GWC

#### Sewage treatment plant

#### Gotha, Germany

- 1 Passavant® Grit Chamber Scraper
- 2 Passavant® Claw Screens as coarse screens
- 2 Passavant® Claw Screens as fine screens
- 16 Passavant® Surface Brush Aerators Mammutrotor® with guide baffle
- 2 Passavant® Sludge Thickeners
- 8 Passavant® Circular Scrapers

#### Sewage treatment plant

#### Warthausen, Germany

- 2 Noggerath® Centre-Flo™ CF
- 1 Noggerath® Wash Press NWP

#### Sewage treatment plant

#### Dubai, United Arab Emirates

1 Noggerath® Spiral Sieve
 Compactor NSI/D-T RED Passavant®
 Compact Unit Combi TOP



#### Noggerath® Centre-Flo™ CF

#### Herdorf, Germany

- 2 Noggerath® Centre-Flo™ CF
   (1 in main channel and 1 in secondary channel)
- 1 Noggerath® Wash Press NWP



### Passavant® Circular Scrapers for the intermediate sedimentation tanks

#### Munich, Germany

6 Passavant® Circular Tanks
 Double bridge design with compensation control



### Noggerath® Grit receiving/treatment Cambrils, Spain

- 1 Noggerath® Bunker
- 1 Noggerath® Rotary Drum Screen RSH-I
- 1 Noggerath® Spiral Conveyor SC
- 1 Noggerath® Vortex Pump BWP
- 1 Noggerath® Grit Washer GWC



### Passavant®/Geiger® Cable-Operated Bar Screens COB

#### Casa Colorada Profunda, Mexico

- 3 Passavant®/Geiger® Cable-Operated
   Bar Screens COB
- 6 Passavant® Penstocks



#### Passavant® Multi-Rake Bar Screens KUR

#### Marseille, France

■ 3 Passavant® Multi-Rake Bar Screens KUR-C



#### Passavant® Penstocks

#### Rastatt, Germany

■ 4 Passavant® Penstocks



Noggerath® Grit Washers GWC Val Venosta, Italy

■ 2 Noggerath® Grit Washer GWC



Noggerath® Rotary Drum Screens RSI-DD

#### Ataköy-Istanbul, Turkey

■ 8 Noggerath® Rotary Drum Screens RSI-DD



#### Passavant® Surface Brush Aerators Mammutrotor®

#### Heraklion, Greece

- 12 Passavant® Surface Brush Aerators Mammutrotor®
- 12 Passavant® Guide Baffles



#### Noggerath® Rotary Drum Screen RSH-MG

#### Outapi, Namibia

■ 1 Noggerath® Rotary Drum Screen RSH-MG



#### Noggerath® Rotary Drum Screens RSI-DD

#### Dubai, United Arab Emirates

- 6 Noggerath® Rotary Drum Screens RSi-DD
- 2 Noggerath® Shaftless Spiral Conveyor SC



#### Passavant® hydrograv® Adapt System

#### Nansemond, USA

- 1 Passavant® hydrograv® Adapt System
- 1 Passavant® Central Drive



Noggerath® Spiral Sieve NSI-T-RED Kent Country, USA

■ 1 Noggerath® Spiral Sieve NSI-T-RED



Passavant®/Geiger® Cable-Operated Bar Screens COB-C

#### Doha, Qatar

- 4 Passavant®/Geiger® Cable-Operated Bar Screens COB-C
- 1 Noggerath® Shaftless Spiral Conveyor SF-360



Noggerath $^{\mathbb{R}}$  Centre-Flo $^{\mathsf{TM}}$  CF

#### Staranzano, Italy

- 1 Passavant® Multi-Rake Bar Screen KUR-D
- 2 Noggerath® Centre-Flo™ CF
- 1 Noggerath® Wash Press NWP



Noggerath® Overflow Screens OVF

#### Malata, Spain

■ 6 Noggerath® Overflow Screens OVF



Passavant® Cloth Filtration PCF®

#### Podersdorf am See, Austria

■ 2 Passavant® Cloth Filtration PCF®



more case studies

