

Stormwater Treatment Business Unit Technologies and Products









PROCESS ENGINEERING

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MECHANICAL ENGINEERING



AUTOMATION



PRODUCT DEVELOPMENT



MANUFACTURING OF PRODUCT COMPONENTS



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OPTIMISATION

INSTALLATION

COMMISSIONING





TRAINING

MAINTENANCE & SERVICE



TURNKEY PLANT CONSTRUCTION





BUSINESS UNIT STORMWATER TREATMENT TRIED AND TESTED CONCEPTS FOR STORMWATER TAN

EQUIPMENT AND NEW PRODUCTS FOR SEWER CLEANING AND FLOOD PROTECTION



Our products and systems ensure that we begin affecting the water flow at precisely the right location to ensure that combined wastewater and stormwater takes the right route and is steered efficiently to its destination.





SEWER NETWORK MANAGEMENT / FLOOD PROTECTION / STORMWATER RETENTION SYSTEM







APPLICATION

- Reservoirs, tanks, weirs or dams as part of municipal networks or industrial plants
- Incorporated as storage, allowing a controlled discharge of wastewater to the subsequent sewage system or wastewater treatment plant during flooding

TECHNOLOGY | **PROCESS**

The purpose of drainage networks is to contain and safely transport wastewater, and to permit excess rainwater from being removed from the sewage system. This in effect reduces the volume of mixed rain and wastewater being treated as well as the process engineering costs.

Stormwater retention systems should take up large volume of mixed rain and wastewater during flooding, and later discharge it in a controlled way. An effective process engineering solution must ensure controlled inflow and discharge of the stormwater, as well as automated cleaning of the tank/reservoir.

Normal dry-weather flow in a pipeline, sewer or main collector passes through a flow-dividing structure.

Sewers can be maintained by manually flushing them, or through the use of flushing vehicles. A mechanical or electromechanical throttle valve at the flow-dividing structure can automatically adjust the discharge level to a specified amount.

During a flood, substantial quantities of combined rain water, wastewater and detached deposits from the upstream sewage network are carried to the flow-riding structure.

There, excess water is contained, floating debris are removed and the overflow adequately managed. In addition, mechanical or electromechan-





ical overflow flap valves, floating scum-boards, automatic disc filters or fine-screens can be used to remove floating debris.

An overflow tank in combination with carefully selected gates or electromechanical valves should be incorporated as a buffer system to protect the storm-water reservoir downstream from overloading.

The stormwater tank takes up the designated amount of mixed rain/wastewater and mechanically regulates the controlled discharge.

After the stormwater reservoir has been fully drained, process controlled jet cleaners, flush-

ing flaps or flushing tipping buckets, are used for automatic flushing of the bottom of the tank.

The exact type of automatic cleaning to be used is dependet on:

- Local conditions such as gradient, whether the sump is more readily flushable, whether the residual waste is to be pumped, and/or any additonal operator requirements.
- wks group provides consulting support regarding advantages or limitations of recommended equipment, its installation, commissioning and maintenance.









PROCESS ENGINEERING COMPONENTS

- Pumping stations
- Cleaning equipment for retaining coarse material, such as disc filter systems for fine bar screens
- Scumboards for retaining floating material
- Flap valves and weirs for water level control
- Flushing equipment (surge flushing) such as flushing tipping buckets or flushing flaps
- Flow control systems such as flow restrictors and discharge controllers
- Control systems for fully automatic operation
- Optional integration in the process control system







- Fully integrated to ensure optimum functionality and reduced investment and operating costs
- Significant increase in functional safety and reliability in comparison to standalone solutions
- Modifiable range of equipment adaptable to specific conditions
- Fully-automatic operation with individually tuned control systems
- Flushing equipment (flushing tipping bucket) does not depend on external energy sources and requires relatively low volumes of water for flushing
- Easy operation and maintenance
- The system and its components are well suited for retrofitting or upgrade

SEWER FLUSHING VEHICLE RW-S-KSW

A mobile sewer flushing vehicle for resource-efficient cleaning of medium to large profile sewers requiring no external energy sources

APPLICATION

- Sewer dimensions ≥ 1,500 mm
- Long pipes
- Long sewers
- Industrial facilities

PRODUCT DESCRIPTION

Currently, the most frequently used cleaning technology for sewers is the combined highpressure flushing and extraction of the sludge-water mixture.

This method is especially expensive in large sewers, it can have a significant impact on the environment and pose threats to health and safety of the operating staff.

By contrast, our newly developed sewer flushing vehicle is characterised by its being autonomous (no external energy source required), emission free and safe.

The RW-S-KSW is used to automatically remove mineral and organic deposits from large sewers with low gradients. It can be used in a either mixed rain and wastewater, or normal wastewater sewers. The flow of water pushes the vehicle forwards by building pressure at the vehicles rear at a speed of approx. 1–10 cm/min, depending on the quantity of deposit being moved.

By using the potential energy of the upstream water, a fixed, defined flushing wave in front of the cleaning shield picks up the deposits in front of the vehicle and transports them down the sewer.

The deposits are transported for long distances until a suitable point is reached, at which the material can be extracted.

Considering that once the device has been positioned in the sewer, this cleaning occurs entirely autonomously, the vehicle can stay in the sewer for prolonged periods of time.

The cleaning occurs steadily, effectively and without haste until a grit trap aboveground are impeded.

The development was funded by the German Environmental Foundation (Deutsche Bundesstiftung Umwelt).







DESIGN FEATURES

- Swivel side flaps for adapting to different pipe cross-sections
- Automatic, controlling overflow flap valves adjusted to water level
- Streamlined design to avoid fouling/ entanglement
- Hydraulic negative brake for controlling the cleaning speed
- Modular structure for within the sewer
- Stainless-steel construction

ADVANTAGES

- 100 % environmentally friendly sewer cleaning method (no energy or freshwater consumption needed during cleaning)
- Cost-effective sewer clearing due to low investment and operating costs:
 5–10 times more cost-effective than high-pressure flushing
- Long distances can be serviced and the use of suction vehicles is vastly reduced
- Working distance determined by the local circumstances of the sewer network
- Autonomous, automatic sewer clearance
- High operating safety due to unmanned deployment of vehicle
- Compared to jetting methods, no risks of sewer damage
- No obstruction to traffic
- Improved health and safety conditions thanks to reduced risk of accidents





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SCUM-BOARD

Scum-boardshold back solid and liquid floating debris from upstream waterRW-T-FScum-board, fixed installationRW-T-RSScum-board, radial floating actionRW-T-VSScum-board, vertical floating action

APPLICATION

- Stormwater tanks
- Combined rain and wastewater tanks
- Sewers
- Flow-dividing structures
- Pumping stations
- Inlet structures
- Open bodies of water
- Wastewater treatment plants
- Industrial facilities

PRODUCT DESCRIPTION

It is the vertical plates of the scum-boards which largely retain solid or liquid floating debris in the upstream water. Their immersion depth, distance from the sill and from the bottom are all factors that must be carefully considered in order for the system to function optimally.

The effective retention of floating solids can be significantly affected by strong currents, turbulence, suspended substances in the layer of water between the surface and the



bottom, as well as by other factors. These various effects can be reduced by selecting a suitable scum-board type (e.g. RW-T-RS or RW-T-VS) according to the specific conditions. The RW-T-RS and RW-T-VS type scum-boards have the significant functional advantage that their protrusions above the water level and their immersion depths always remain constant even if the water level changes. In comparison, the RW-T-F scum-board makes it impossible for floating debris to "swim beneath" its sill. In the situation where permanent pondage is an issue, we recommend using a type RW-T-F scum-board.

DESIGN FEATURES

- Scumboards are made of stainless-steel or GRP
- Customisable
- Variety of fixings and bearings available
- Possible coupled segment design
- Standard available overall lengths between 0,5–25 m, customisation possible
- Easily combined with adjustable sharpedged weir crests

- Effective retention of floating solids
- Minimum maintenance requirement
- Easily combined with adjustable weir crests
- Possible use on curved sills
- Retrofittable
- Cost-effective







WEIR

Weirs are used for controlling water-level, backwater and flood protectionRW-W-SKWeir sill, sharp-edged, fixed or adjustable installation,
if required with rear ventilationRW-W-MEC-SWater level control weir – float controlledRW-W-MEC-GWater level control weir – weight controlledRW-W-ELTWater level control weir – electrically controlledRW-W-HYDWater level control weir – hydraulically controlled

APPLICATION

- Overflow relief structures
- Stormwater and combined wastewater tanks/reservoirs
- Additional storage capacity in sewers
- Flow-dividing structures
- Pumping stations
- Inlet structures
- Open bodies of water
- Industrial facilities

PRODUCT DESCRIPTION

Weirs are often designed and used at overflow sills to retain upstream water to a specified level. To this end the weir shutters are usually in their maximum upright position.





The weir shutters of the RW-W-MEC respond, without the need for external energy, through the build-up of water pressure.

The systems of the RW-W-ELT and RW-W-HYD act in response to measurements and the input of external energy. They can be used to keep an adjustable upstream water level constant.

After the recession of the water level following a flood, the weir shutters return to their original designated position.

DESIGN FEATURES

- Weirs can be made from a variety of grades of stainless steel or wherever required, from GRP
- Material can be customised according to requirements
- Different types of fixings available
- Retrofittable
- Customisable heigths and lengths
- Can be external energy driven, where measurements and regulating actions are required
- Available with explosion protected drive units

- Reliably controlled initiation of overflow and steady control of operating level
- Available as either energy autonomous, or with external energy source connections, where measurement and/or control required
- Low maintenance
- Cost-effective
- Easy to retrofit





DISC FILTER SYSTEM RW-R-SFS

Disc filter system for retaining fine and coarse substances from flowing liquids



APPLICATION

- Stormwater tanks or reservoirs
- Combined rain and wastewater tanks or reservoirs
- Storage areas within sewage networks
- Flow-dividing structures
- Pumping stations
- Inlet structures
- Wastewater treatment plants
- Industrial facilities

PRODUCT DESCRIPTION

A highly tuned combination of cast metal, hydraulic and system-control components. The disc filter is particularly effective in holding back floating and suspended debris from communal or industrial wastewater channels during flooding. It is commonly used to hold back debris from entering storm overflow tanks and reservoirs. An adaptable, customisable design and construction permits the installation and effective operation of the disc filter almost universally, irrespective of local currents and specific mounting conditions. The adjustable speed of disc rotation ensures an optimum retention and clearing of floating and suspended debris from the filter. Functionality and energy efficiency is additionally increased through control of the disc rotation in accordance to the water level.

DESIGN FEATURES

- Each filter rotor is driven by connected, adjustable hydraulic motors
- No floating bearings required
- Optimised bearing and debris-collecting plates
- System-controlled optimisation of debris clearing rate, according to water level
- Customisable configuration and mounting



- Highly functional and reliable owing to its design and disc rotation
- Easily adjustable speed of disc rotation
- Reliable removal of debris
- Easy maintenance
- Low investment and operating costs





STORM WATER

END POSITION CLEANING RW-R-ER

Fully integrated solution for cleaning the end positions of horizontal bar screens, largely preventing entanglement and solidification of screenings

APPLICATION

• Cleaning the end positions of horizontal bar screens

PRODUCT DESCRIPTION

The end position cleaning consists of a skimming comb fitted on a roller at each end of a screen and is fully integrated into the hydraulic system. When the cleaning comb reaches the end position, the cleaner folds inwards and forms an inclined edge from which debris are discharged.

As a result, even larger debris from the sewer can be discharged.

When moving back in the reverse direction, the configuration reverses itself and debris are again ejected into the canal, once the comb has reached the opposite end position.

DESIGN FEATURES

- The debris are transported in the direction of flow along the screen area
- Debris are transported to, and discharged at the edge of the collection screen thanks to an electro-hydraulic actuator
- The skimmed off debris are transported to an inlet channel
- Rotating pivots at each end of the screen power the movement of the comb mechanism
- The system cleaning is residue-free
- Minimum cleaning depth 1.5 x bar depth
- Event-orientated control



- Total integration of the end position cleaning within the hydraulic system
- Functional sequence and control of end position cleaning is fully integrated into the cleaning system of the horizontal bar screens
- Component design adapts to each horizontal bar screen
- Minimises the problems of clogging and entanglement at both ends of the screen
- The End Position Cleaner permits optimised use of the whole surface area of the horizontal bar screen
- Rapid and cost-effective replacement of spare parts thanks to a clever design
- Available for every horizontal bar screens type and size







FLUSHING FLAP RW-S-KLA

Flushing of deposits within low-height tanks and sewers



APPLICATION

- Stormwater tanks
- Combined rain and wastewater tanks
- Sewers
- Wastewater treatment plants
- Industrial facilities

PRODUCT DESCRIPTION

Within the scope of an automated cleaning program the RW-S-KLA flushing flaps are locked and the flushing chambers are filled with drinking water, raw water, surface water, treated or under certain circumstances untreated combined raind and wastewater. The filling process ends when the flushing chambers are completely full. The control program then checks whether the program is completed and whether the complete flushing sump volume is available. The whole process is completed in 30 to a maximum of 60 minutes. It is preferable to plan an automatic follow-up flush.

In the event of intermediate or short-duration events, closed-loop controls are recommended.

DESIGN FEATURES

Type RW-S-KLA flushing flaps are optimised by weight and choice of material, and are designed for relatively large flushing volumes. The system relies on careful measurement and control of the flap opening and closing mechanism.

The size and quantity of flaps is calculated during the project planning phase.

No mechanical noises occurs. As an equipment supplier we also provide recommendations concerning gradients, flushing chambers, flushing water, controls and flushing sump size, where applicable.





ADVANTAGES

- High operational reliability
- Good cleaning results
- Improved health and safety: reduction of hazards

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Customisable







BACKFLOW TRAP RW-A-RSK

A simple solution for the containment and release of overflow water whilst simultaneously preventing the entry of backed-up downstream water

APPLICATION

- Flow-dividing structures
- Stormwater overflow tank/reservoirs
- Pumping stations
- Watercourse inlets
- Industrial facilities

PRODUCT DESCRIPTION

Backflow traps are a reliable solutions for resistance-free passage of the maximum overflow water from a structure and the reliable prevention of entry of backed-up downstream water into a structure. In the case of flooding, the backflow trap allows overflow in the floating configuration or rather the RW-A-RSK opens as the result of the build up of pressure.

At very low discharge volumes, it is necessary to remove residual water in order to minimise deposits and odors. In high flooding events where a reverse flow occurs, the pressure of the reverse flow forces the trap shup and prevents backflow of water into the system.

DESIGN FEATURES

RW-A-RSK is designed with the best suited materials (diverse grades of stainless steel, plastic or GRP) for optimum function. The specific sizes and types used correspond to the technical conditions of the project and to the requested specifications of the client. Any necessary emptying of residual water can be carried out at the trap entrance or at some other suitable position.

Floating backflow traps should also be considered as possible specialised solutions. Backflow traps are therefore designed, produced and delivered for a specific project, and are installed ready to use.





ADVANTAGES

- High reliability
- Low investment and operating costs thanks to a simple design and function

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- Effective protection against unauthorised access
- Easy operation and maintenance conditions







FLUSHING TIPPING BUCKETS RW-S-KIP

Cleaning equipment for removing deposits in tanks and sewers with the help of surge flushing

APPLICATION

- Stormwater tanks/reservoirs
- Combined rain and wastewater tanks/ reservoirs
- Sewers
- Wastewater treatment plants
- Industrial facilities

PRODUCT DESCRIPTION

Automated flushing tipping buckets can be filled with either drinking water, raw water, surface water, treated water, or under certain circumstances, untreated mixed rain and wastewater.

When the bucket is completely full, the centre of gravity of the RW-S-KIP shifts and causes it to tip and empty itself without external energy. An optional system controlling the emptying of the bucket is also available. The strong surge of the wave flushes deposits from the basin bottom to the structural flushing sump. This process is completed in approximately 30 minutes. Automatic follow-up flushing can be set. Closed-loop controls are recommended for possible intermediate or short-term subsequent events.

DESIGN FEATURES

RW-S-KIP flushing tipping buckets are made of stainless-steel, designed on the basis of FEM models. They have a low weight, optimum torque, variable bearing type with permanent lubrication, no mechanical noise, optimised RW-S-KIP volumes from 350 l/min to 2,000 l/min with adapted overall lengths and coupled versions also possible.

The RW-S-KIP product can be fitted with the wks flushing tipping bucket locking system.





ADVANTAGES

- High operational reliability
- Very good cleaning results
- Low flushing water requirement
- In principle, external energy-free

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- Tipping bucket coupling possible
- Tipping bucket locking option
- Individually adaptable size







FLOW CONTROL SYSTEM RW-D-ELT | RW-D-MEC

The task of flow restrictors/discharge controllers is to limit the discharge quantity from retention chambers to an electronically adjustable or level-controlled value.

APPLICATION

- Flow restrictor manholes
- Flow-dividing structures
- Stormwater overflow tanks and reservoirs
- Pumping stations
- Water treatment plants
- Industrial facilities

PRODUCT DESCRIPTION

Adjustable and reliable, the flow control system responds to the state of the water upstream and downstream. The states are monitored and are automatically compared with set parameters. As soon as the flow rate



approaches a threshold value, the flow opening of the RW-D-ELT is adjusted. The flow opening is continously adjusted according to the inlet pressure and so, exceeding the threshold is avoided. Where indicated it is possible to use intermittent operation.

Possible pollution in the main sewer is controlled by means of an automatic flushing program or via a manual/automatic bypass.

DESIGN FEATURES

The flow control system is made of stainlesssteel, and can be combined with suitable drives and instrumentation according to project requirements.

The dimensions and configuration will either conform to the ATV standards or correspond to the technical conditions of the project or with the specifications of the client. The dimensions and configuration of the RW-D-ELT are therefore customised for each individual project.



ADVANTAGES

- Fully automatic discharge control
- Modular design
- Low investment and operating costs

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- Automatic flushing programs
- Easy operation and maintenance







PARTIALLY MOBILE FLOOD PROTECTION SYSTEM RW-MHWS

Reliable, partially mobile flood protection system for diverting surface water and sewage during heavy rainfall

APPLICATION

- Areas at a risk of flooding
- Flood plains
- Sewers
- Wastewater treatment plants
- Stormwater overflow tanks/reservoirs

PRODUCT DESCRIPTION

In collaboration with the Technical University Dresden, wks Technik GmbH developed this partially mobile flood protection system, which works reliably, even with high solidloaded run-off. The tried and tested Mammoth or Air-Lift pump has a particularly large riser diameter which avoids wear and blockages. The driving force is from air blown into the pipe, which displaces the water and carries it upwards. The necessary air can be provided by a fixed or mobile compressor. This flood protection system is a modular solution adaptable to specific conditions. The development was funded by the German Federal Ministry for Economic Affairs and Energy (Bundesministerium für Wirtschaft und Energie).

DESIGN FEATURES

- Four components operating together as a system
 - 1. Collection shaft
 - 2. Riser with special air inlet chamber
- 3. Mobile compressor with diesel unit or electrical connection
- 4. Automation unit with water level sensor
- Flow rates from 500 to 3,500 m³/h
- Pipes made of stainless steel
- Free pipe cross-section





ADVANTAGES

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- Maximum operating reliability, owing to there being no moving parts in the riser which would otherwise result in wearing or blockages
- Modular, customisable for specific conditions and requirements
- Long service life
- Ready for use
- No ATEX approval necessary, as there is no ignition source present
- Easy to operate
- Extended-use period
- Low-maintenance





Innovative products, integrated technologies and intelligently networked systems for municipalities and industries

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Group memberships/partnerships









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