

HUBER Sewerage Program



Machines and system solutions for stormwater
treatment and sewer system management



►► Equipment and system solutions for application in combined and separated sewer systems

Advanced combined and stormwater treatment in municipal combined sewers is a main issue with regard to sustainable environmental and water protection. The building of new wastewater treatment plants and the upgrading or refurbishing continuous wastewater discharges has significantly increased the quality of many watercourses. Despite all of these efforts however, there are still ecological problems caused by floating and coarse material discharged from the sewer system into the waters in a stormwater overflow discharge event in both a combined and separated sewer system. For the purpose of specific environmental protection appropriate measures will have to be taken in future to minimise these problems.

Solids retention

HUBER screening plants prevent the floating and/or coarse material passing from the sewer system into watercourses. The HUBER systems available differ in their type of screening elements (bar screen or perforated plate) and their installation position that can be on or behind the overflow sill. In order to achieve the maximum possible solids retention, each plant is individually tailored to optimally suit site specific hydraulic and constructional conditions. With its vast reference list HUBER has attained the experience and knowledge to handle any application and situation that may arise throughout the world.

Cleaning of stormwater retention tanks

Due to the limited storage capacity of sewers, additional storage facilities are installed at exposed positions, such as stormwater overflow, retention or clarification tanks, which retain the first flush of stormwater and discharge smaller amounts of water to the wastewater treatment plant. During intermediate storage of the wastewater in the tanks, the coarse material settles on the tank bottom. To maintain the performance of stormwater storage basins, sewers or sewers with storage capacity and overflow, it is necessary to provide suitable cleaning systems in order for these facilities to eliminate odours caused by biogas production and prevent biological activity of the mainly organic substances in the sediment of the sewer or tank bottom which could become an increasing health risk. The most efficient, reliable and cost-effective cleaning method available is sewer flushing. The HUBER Tipping Buckets SK with their mature design have over the years been well proven for their efficiency in the cleaning of storage tanks and are able to achieve the maximum performance due to project-related dimensioning.

Sewer flushing

The main reasons for steadily increasing sedimentation on the bottom of sewer systems and stormwater retention sewers are an insufficient sewer base slope, regular retention combined with slow flushes and a low flow velocity. The sediments will be hardening in the course of time. Frequently, such hardened material layers are 30 cm thick or even higher. The negative impacts to the sewer net and the reduced pollution loads at the wastewater treatment plant are negative effects and will significantly increase stormwater overflow quality and quantity discharged into the receiving water courses. Furthermore, the biological activity of such mainly organic sediments may lead to odour annoyance caused by biogas generation and to health risks caused by the increased germ load.

An innovative sewer flushing system with patented gates has been developed for sewers, and sewers with storage capacity and overflow. This system includes for the option for sewer network control and sewer storage capacity activation. The main features of the system are its small space requirements, the innovative design without frame that allows installation at any point in the sewer, its resistance to tressing, and the self-cleaning flap gates, which retain the flush water. When the level of retained water exceeds the maximum permissible water level within the retention chamber, the gates quickly open and suddenly release the retained water as a powerful flush.

Constant design retention level

Against the background that investment and operating costs need to be reduced, it is imperative to utilise unused storage potentials through maintenance of a constant design retention level in combination with a screen. In addition to the high economic benefit achieved by reduced investment costs for storage structures the environmental burden can significantly be minimised by using a screening plant whilst the operational behaviour of storage structures is also gaining in importance. Measuring devices are therefore required at overflow sills for accurate measurement of the screened combined water overflow. They allow the operator the co-ordination of information regarding servicing, operation and maintenance of stormwater tanks. The combination of measuring equipment with a screening plant had been previously impossible but is now no longer a problem with the Huber system available which is a favourably priced and efficient solution for any application.

➤ Examples of problematic situations in combined and stormwater sewers



Sewers without equipment for discharge volume measurement



Stormwater overflow structures without a preceding fine screen



Insufficient cleaning of stormwater storage tanks after the tank emptying phase



Excessive sedimentation in sewers

➤ Combined and stormwater treatment



ROTAMAT® Storm Screen RoK 1 installed **behind** the overflow sill

Product specification:

The ROTAMAT® Storm Screen RoK 1 is an automatically cleaned screen for stormwater and combined water treatment and is horizontally installed directly behind the overflow sill at overfall weir level. A screw is mounted on a half cylinder of perforated plate (standard perforation: 6 mm). Wear-resistant brushes on the screw flights clean the perforated plate.

The screen is driven by a submersible, ex-protected IP 68 motor.

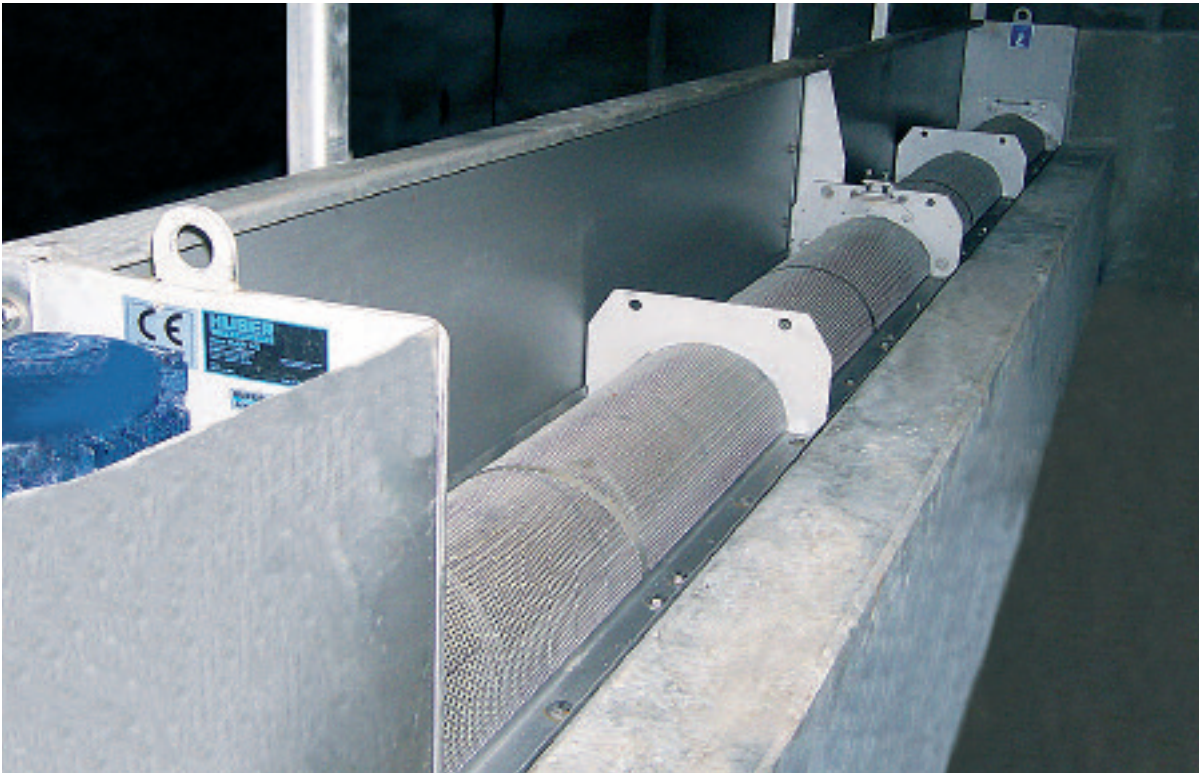
During wet weather events, the flow streams through the screen from the top down and the solids are retained on the screening surface and then transported to the screenings discharge unit by the rotating screw. Simultaneously the strainer section is cleaned by means of the wear resistant brush secured to the outside flights of the rotating screw.

As standard the screenings are returned to the channel and thus the sewage treatment plant inlet. However there is also the possibility of transporting the screenings to further disposal by means of a screw conveyor. During storm conditions the machine is automatically started and then works fully automatically.

The user's benefits:

- Optimal solids retention by means of two-dimensional screening
- Low hydraulic resistance due to installation at spillway height
- The perfect solution for discharges with limited upstream head possibilities
- Especially suitable as a preliminary stage for protection of soil filter retention plants
- For problem-free retrofitting into existing structures
- Availability of completely submerging the screen
- Especially suitable for long-term use in the wastewater sector as completely made of stainless steel and acid treated in a pickling bath

➤➤ Combined and stormwater treatment



ROTAMAT® Storm Screen RoK 2 installed **in front of** the overflow sill

Product specification:

Also the ROTAMAT® Storm Screen RoK 2 is an automatically cleaned screen for stormwater and combined water treatment but is installed directly in front of the overflow sill. Again, a screw is mounted on a half cylinder of perforated plate (standard perforation: 6 mm). Wear-resistant brushes on the screw flights clean the perforated plate. The screen is driven by a submersible, ex-protected IP 68 motor.

During wet weather events, the flow streams through the screen from the bottom up and the solids are retained on the screening surface and then transported to the screenings discharge unit by the rotating screw. Simultaneously the strainer section is permanently cleaned to ensure the maximum possible screen throughput is achieved. As standard the screenings remain in the tank or are transported with the wastewater flow to the sewage treatment plant. During storm conditions the machine is automatically started and then works fully automatically.

The user's benefits:

- Optimal solids retention by means of two-dimensional screening
- The perfect solution for discharges with limited upstream head possibilities
- As a standard the screenings remain on the polluted water side
- Especially suitable as a preliminary stage for protection of soil filter retention plants
- No downstream impact on the screen efficiency
- For problem-free retrofitting into existing structures
- Availability of completely submerging the screen
- Especially suitable for long-term use in the wastewater sector as completely made of stainless steel and acid treated in a pickling bath

➤ Combined and stormwater treatment



HUBER Stormwater Bar Screen HSW installed on the sill of the structure

Product specification:

The HSW Screen is a horizontal bar screen for combined and stormwater screening directly on the sill of the structure. The screen consists of a sturdy, closed square profile frame designed to resist the water pressure, with openings to suit the bar rack elements. These are prestressed to maintain the bar spacing of 4 mm and consist of rolled flat steel and are of a hydraulically favourable design. In order to prevent complete blinding of the bar rack in the event of overflow discharge, the bar rack is permanently mechanically cleaned whenever the defined retention water level elevation is exceeded. The screen is driven by a submersible IP 68 motor. Whilst the screen bars are cleaned gently to protect the screenings, the linear chain drive ensures a defined symmetric transmission force into the screen construction.

An innovative feature of the HUBER Storm Water Bar Screen is its screening chamber with integrated gates, the task of which is to keep the average flow velocity in the screen area virtually constant under all operating conditions. The screening chamber height, which defines the start of an overflow discharge cycle, is individually adjusted to suit the specific hydraulic requirements.

The user's benefits:

- Reliable retention of floating and coarse material
- Automatically controlled screen surface cleaning
- Increased operating stability with flushing and cleaning gates
- Exceptional high performance at a low pressure loss
- Well-proven 4 mm bar spacing
- Direct screen drive with a submersible IP 68 motor
- Possibility of completely submerging the screen
- Well-proven stainless steel design

➤➤ Combined and stormwater treatment



Outdoor installation of a ROTAMAT® Screen for pumping stations RoK 4

Product specification:

The compact vertical pumping station screen RoK 4 is an automatically cleaned screen that combines screening, transport and compaction in a single unit. The screen consists of a vertical screen basket and a shafted auger in a vertical tube.

The wastewater flows through an inflow chamber and then through the perforated plate screen basket which removes the screenings fully automatically. Within the vertically installed screen basket the flights of the screw are equipped with wear-resistant brushes for effective cleaning of the screen. As the screenings are gradually elevated by the auger, they are dewatered by gravity drainage. A screenings compaction zone is located above the auger. Water is pressed out of the screenings through perforations in the vertical tube. The compacted screenings are discharged through a chute into a container or endless bagger thus eliminating odour nuisance. The filtrate drains off by gravity or may be lifted by pump.

The user's benefits:

- Compact automatic screening, lifting and compaction in a single unit
- Optimal solids retention by means of two-dimensional screening (perforated plate)
- Prevention of clogging and tressing in the pumping station
- Easy to install into existing structures
- Integrated bottom step to prevent sedimentation in the inlet sewer
- Optional frost-protected unit for outdoor operation
- Availability of completely submerging the screen

➤ Cleaning system for storage tanks in combined and stormwater treatment



HUBER Tipping Buckets SK for efficient stormwater storage tank cleaning

Product specification:

HUBER Tipping Buckets are a sturdy, reliable system for cost-efficient cleaning of stormwater storage tanks.

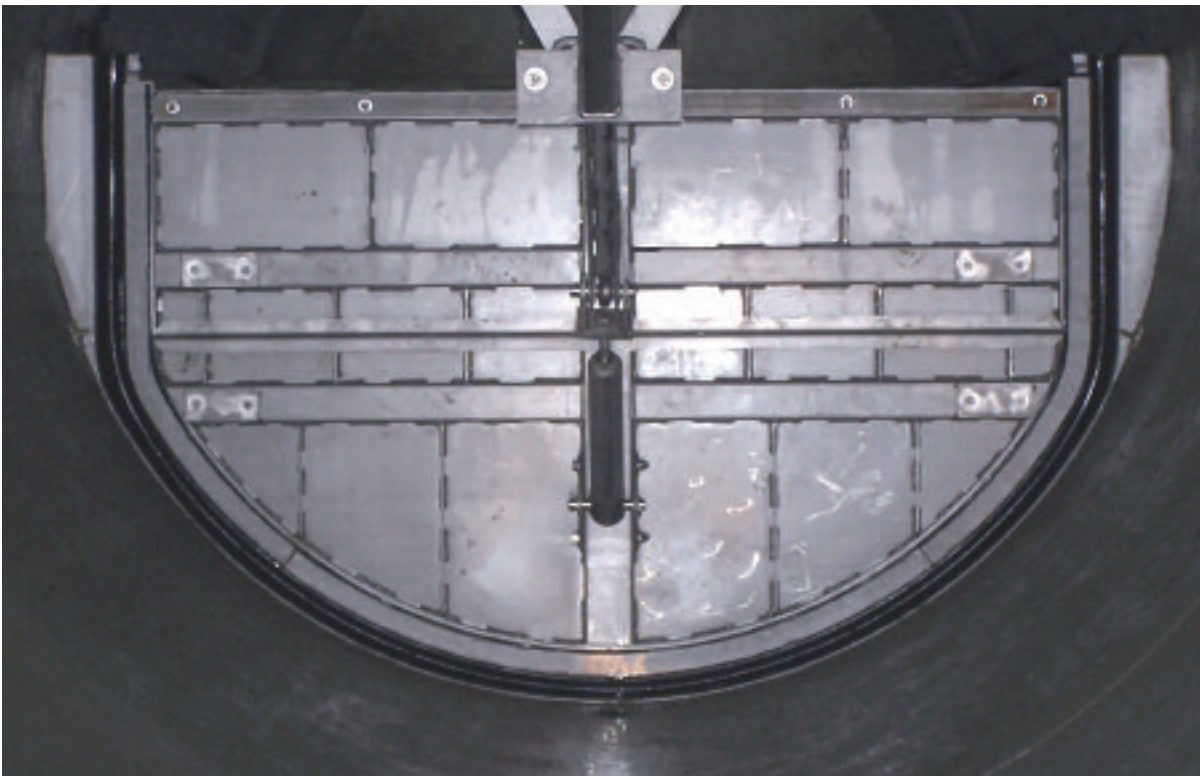
Whilst wastewater is intermediately stored in a tank, the coarse material contained settles on the bottom of the tank. To remove the settled material, especially in rectangular storage tanks, tipping buckets are used which consist of a trough that takes up the flush water.

The trough is supported outside the axis of rotation by wastewater resistant slide bearings designed especially for the static and dynamic loads. During the filling process a torque is generated as the filling level in the trough increases, which effects automatic tipping of the bucket when the trough is completely filled. The generated powerful, long flush reliably removes the sediments from the tank bottom. The special bucket design effects a low-noise tipping operation so that no further noise protection is required.

The user's benefits:

- High efficiency due to powerful, long flushes
- Low-noise tipping
- Low energy demand
- Optimised slide bearing for an easy tipping motion
- Different suspension options available
- Well-proven low-cost cleaning system
- Prevention of putrefaction and odour nuisance
- Reliable project-specific dimensioning
- Reliable, maintenance-free stainless steel construction, acid treated in a pickling bath

➤ Cleaning system for sewers and sewers with storage capacity and overflow



HUBER Power Flush® – Sewer flushing System for sewer systems and sewers with storage capacity and overflow

Product specification:

Cleaning of sewers and stormwater retention sewers has been gaining in importance recently. The main reasons for the ever increasing sedimentation at the bottom of sewer systems and stormwater retention sewers are an insufficient sewer base slope, regular retention combined with slow flushes and a low flow velocity. As a result, the sediments will harden over the course of time. The subsequent reduced sewer cross section impairs the system efficiency so that the solids will settle and the already sedimented solids no longer be remobilised and transported. The negative impacts to the sewer net and the reduced pollution loads at the wastewater treatment plant are negative effects and will possibly significantly increase stormwater overflow quality and quantity discharged into the receiving watercourses. The innovative HUBER Power Flush® allows for complete removal of sediments in sewers and at the same time activation of unused sewer capacity. The settled sludge is transported to the wastewater treatment plant at a low flow velocity and in controlled doses. The maximum performance of the sewers and sewers with storage capacity is re-established.

The user's benefits:

- Allows the cleaning of long sewers of up to several kilometres
- No sewer cross section reduction
- No blocking due to self-cleaning gates
- Activation of unused sewer retention volume
- Suitable for any sewer cross section
- Easy retrofit into current sewer operations
- No additional installation openings or special manholes required
- In conformity with ATEX

➤ System solutions for combined and stormwater treatment



Stormwater screening combined with overflow measurement

Product specification:

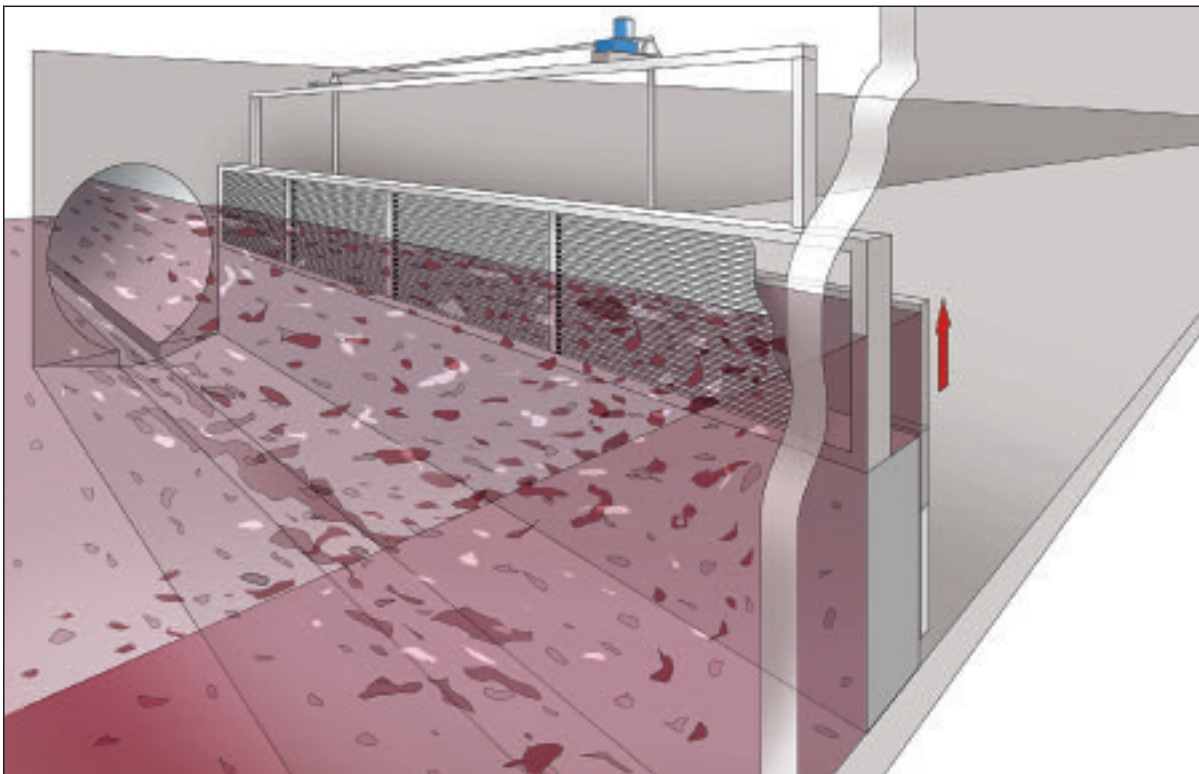
In the event of heavy rainfalls large amounts of combined water may pass into the receiving water course via overflow discharge structures or stormwater overflow tanks. Frequently, there is no screening plant installed with the consequence that the discharged water contains floating and coarse material. In addition, the discharged overflow is frequently not measured and with the omission of measuring equipment will mean a significant loss of critical information relating to the operating behaviour of the storage and overflow structure. The innovative combination of the HUBER ROTAMAT® Storm Screen RoK 2 and a subsequent gauging weir can avoid such unfavourable conditions.

The ROTAMAT® Storm Screen RoK 2 is an automatically cleaned screen for stormwater and combined water treatment which is installed directly in front of the overflow sill. The flow streams through the screen from the bottom up and the solids are retained on the screening surface. Whilst the wastewater flows then over the subsequent gauging weir, the overflow is measured and evaluated by a fully automatic measuring and evaluation unit.

The user's benefits

- The calculated discharge volumes expected can be compared with the actually obtained measuring data.
- Co-ordination of critical information regarding servicing, operation and maintenance of stormwater tanks
- Detection of unfavourable operating conditions (such as backwater, influence of flood water, etc.)
- Obtain valid results and figures with regard to the operating behaviour of storage and overflow structures
- Increase in optimisation of WWTP inflow and combined surplus flow
- Reduction of the load on receiving watercourses due to improved calculations based on the data obtained by means of the measuring equipment
- Reduction of cost for combined overflows

➤ System solutions for combined and stormwater treatment



Stormwater screening combined with activation of unused sewer-storage capacity

Product specification:

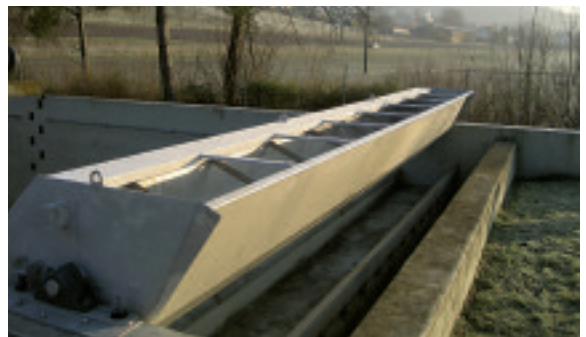
Stormwater overflows within combined sewer systems typically have a fixed weir. When the critical rainfall intensity is exceeded they overflow at a defined water level height and discharge into a receiving watercourse. Fixed weirs, however, have the disadvantage in that the water is already being discharged before the maximum permissible water level is reached with the consequence that the actual storage capacity of the inlet structure remains unused. Frequently this results in new structures having to be built or existing structures extended which ultimately involves high civil costs. Additionally, without screens considerable amounts of floating and coarse material will be discharged into the receiving watercourse which results in water pollution. The combination of HUBER screens with a storage element provides for all possibilities of a controlled constant design retention level and simultaneous stormwater screening.

The type of HUBER screen is selected to optimally suit specific site conditions and is combined with a subsequent storage element which ensures that the screened stormwater will not be discharged until the maximum permissible water level has been reached.

The user's benefits:

- Reduced discharge overflow volume and frequency
- Increased protection of the receiving watercourse through two-dimensional screening
- Activation of unused storage capacity saves civil costs for new storage structures
- Prevention of back-flooding into the sewer network
- Sustainable environmental protection and improved water quality
- Individual and flexible variation of the design retention level
- Option for discharge volume measurement
- Reduction in the costs for combined overflows

➤ Installation examples of machines and systems for combined and stormwater treatment in sewers



Hans Huber AG

Maschinen- und Anlagenbau
Postfach 63 · D-92332 Berching

Phone: + 49 - 84 62 - 201 - 0
Telefax: + 49 - 84 62 - 201 - 810
E-mail: info@huber.de
Internet: www.huber.de

Subject to technical modification

HUBER
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