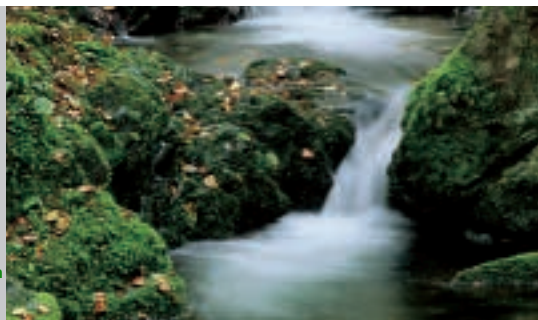




## Innovative Products Worldwide





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**WESTERNTech**  
VIETNAM

## ► WASTE WATER Solutions – Worldwide

HUBER SE, headquartered in Berching, Germany, is globally active in the field of water, wastewater and sludge treatment.

At our headquarters in Berching, 550 employees develop and manufacture products, manage projects and develop system solutions for municipalities and industries. They all work towards improvement of water quality.

Founded more than 175 years ago, today Huber supports its customers through subsidiaries, offices or representatives by providing know-how and innovative products for water, wastewater and sludge treatment.

The family-owned company has a state-of-the-art factory where a wide range of machines and equipment for the international markets is manufactured.

Our highly qualified employees use highly sophisticated manufacturing technologies.

To supply our customers with products of the highest quality, it was decided many years ago to make all products from stainless steel.

Over the years extensive experience and expertise has been acquired in manufacturing stainless steel products for the water and wastewater industry.

As a result of the ongoing product improvement and our product innovation, we are able to offer a full range of products for the global water and wastewater markets.

This brochure provides a general overview of the Huber products and their applications.

You can find out more information about all products and applications on [www.huber.de](http://www.huber.de). If you wish to discuss your needs, please ask our experts for advice and support.

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A variety of stainless steel products for the treatment, storage and distribution of drinking water . . . . . 76

**Global Lifecycle Service**

Worldwide services for optimized plant operation and a long product life . . . . . 82

# ► Wastewater Screening

## Screens for any application

Screening is indispensable as the first step of municipal and industrial wastewater treatment.

Debris must be removed in order to protect subsequent treatment processes from clogging and/or damage. Floating, settling and suspended solids are retained, depending on the bar spacing or perforation diameter, removed and finally discharged.

Based on the same ROTAMAT® principle “screening – washing – conveying – dewatering in a single unit” a family of ROTAMAT® screens has been developed and successfully introduced in the global market of wastewater treatment. In recent years the STEP SCREEN® and the MAX® families have been added. We offer the perfect HUBER screen for:

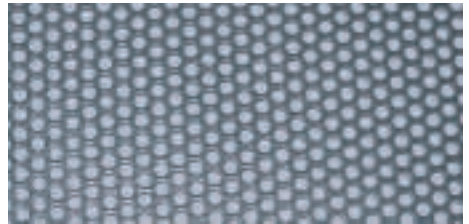
- any installation condition
- any flow rate
- any spacing or perforation size



*Coarse Screen*



*Fine Screen*



*Perforated Plate Screen*



*Mesh Screen*

## ► Wastewater Screening



### **Ultra-fine screens for new applications**

Our development of extremely fine screens for the separation of very fine particles permits new wastewater treatment applications for screens.

Reliable separation of hair and fibrous material is necessary for efficient performance of membrane bioreactors.

Another application for ultra-fine screens is river and sea outfalls. Reduction of the COD/BOD loads from such outfalls is becoming more and more important for the protection of the receiving water bodies.

These ultra-fine screens are able to remove undegradable and degradable, inorganic and organic material at the same time. Improved environmental protection is achieved by application of this new technology at reasonable costs.

Chemical coagulation can temporarily be added to maintain the screening efficiency and high effluent quality even during peak loads. For many regions with insufficient wastewater treatment, if any at all, ultra-fine screening is a quick and affordable first step in the right direction.

## ► Wastewater Screening

### **Climber Screen ClimbMax®**

- Robust design, reliable operation, minimum maintenance
- Easy to retrofit into existing channels
- Available with front or rear raking
- No submerged moving parts
- Bar spacing:
  - Front raked  $\geq 1$  mm
  - Rear raked  $\geq 15$  mm



*ClimbMax® Screen – a well-proven bar screen for very large flows*

### **Multi-Rake Bar Screen RakeMax®**

- High screenings capacity
- Low head loss
- Low installation height above operating floor, even with deep channels
- Bar spacing  $\geq 6$  mm

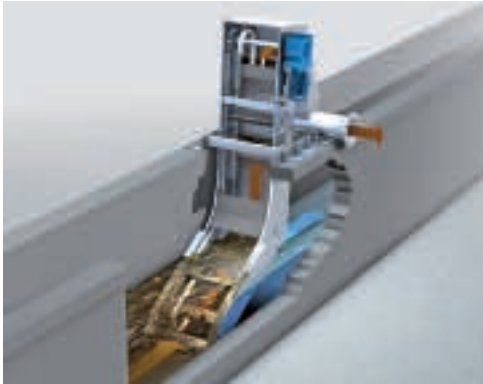


*RakeMax® Screen – robust design for reliable operation*



## ► Wastewater Screening

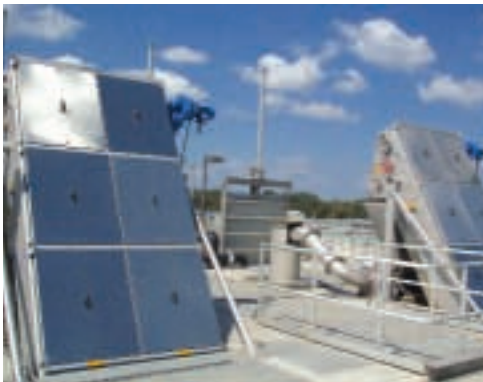
### **RakeMax®-hf Multi-Rake Bar Screen h**



- Combines the benefits of high screenings discharge capacity and low headloss
- Variable installation angle of bar rack and discharge unit
- Bar spacing  $\geq 1$  mm

*The RakeMax®-hf Multi-Rake Bar Screen combines the benefits of high flexibility, low headloss and high screenings discharge capacity.*

### **Belt Screen EscaMax®**



- Excellent capture rate provided by two-dimensional screening elements
- Compact and robust design
- Easy to retrofit into existing channels
- For deep channels with high water levels
- Perforation diameter  $\geq 3$  mm

*Belt Screen EscaMax® – versatile headworks screen*

## ► Wastewater Screening

### **Curved Bar Screen CurveMax®**

- No submerged moving parts
- Low headloss due to the large effective bar rack surface
- Bar spacing  $\geq 0.5$  mm



*Compact Curved Bar Screen CurveMax® for reliable separation of solids from wastewater*

### **ROTAMAT® Fine Screen Ro 1**

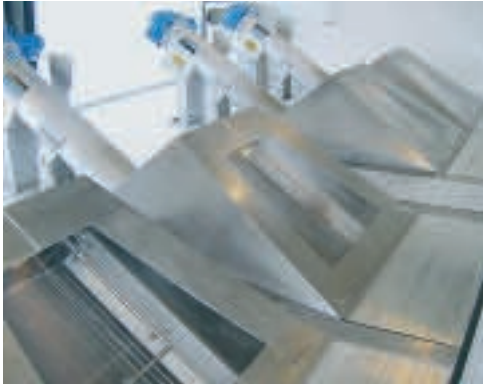
- Screening, conveying, washing, dewatering and compaction in a single unit
- With integrated screenings press
- With integrated screenings washing (IRGA)
- Positive screen cleaning with rotating rake
- Bar spacing  $\geq 6$  mm



*ROTAMAT® Fine Screen Ro 1 for channel or tank installation*

## ► Wastewater Screening

### ROTAMAT® Rotary Drum Fine Screen Ro 2 / RPPS



- Screening, conveying, washing, dewatering and compaction in a single unit
- With integrated screenings press
- With integrated screenings washing (IRGA)
- Rotating screen basket with wedge wire (0.5 - 6 mm), perforated plate (2 - 6 mm)

*ROTAMAT® Rotary Drum Fine Screen Ro 2 with up to 3 m screen basket diameter*

### ROTAMAT® Micro Strainer Ro 9



*ROTAMAT® Micro Strainer Ro 9 – the low-cost screen for small flows*

- Screening, conveying, washing, dewatering and compaction in a single unit
- With integrated screenings press
- With integrated screenings washing (IRGA)
- XL-version with longer screen basket and for higher flow and water level applications
- Economy version Ro 9Ec without washing and compaction
- Wedge wire spacing: 0.5 – 6 mm
- Perforations: 2 - 6 mm
- Mesh screen

## ► Wastewater Screening

### **STEP SCREEN® Flexible SSF**

- Efficient removal and lifting of screenings
- High separation efficiency
- Easy to retrofit into existing channels with no or minimal modification required.
- Lifting of screenings from channel floor
- 3 or 6 mm spacing



*STEP SCREEN® Flexible SSF –  
the original STEP SCREEN®*

### **STEP SCREEN® Vertical SSV**

- For deep channels and high discharge
- Space-saving installation with steep 75° inclination
- For high flow and low head loss
- Lifting of screenings from channel floor
- 3 or 6 mm spacing



*STEP SCREEN® Vertical SSV –  
the improved STEP SCREEN®*

## ► Wastewater Screening

### ROTAMAT® Sludge Acceptance Plant Ro 3



- With the robust ROTAMAT® Fine Screen Ro 1 or Micro Strainer Ro 9
- With integrated screenings press
- With integrated screenings washing (IRGA)
- Optional with integrated grit trap (compact version Ro 3.3)

*ROTAMAT® Sludge Acceptance Plant Ro 3, well-proven in hundreds of installations worldwide*

### ROTAMAT® Screw Conveyor Ro 8 / Ro 8t



- Custom design and fabrication
- With conveyor tube (Ro 8) or trough (Ro 8t)
- Completely encapsulated, odour-free plant

*ROTAMAT® Screw Conveyor Ro 8 / Ro 8t for all types of media to be conveyed and for any installation situation*

## ► Wastewater Screening

### **ROTAMAT® Membrane Screen RoMem®**

- Removal of hairs and fibres
- Protection and improved operation of membrane bioreactors
- Easy retrofit into existing channels
- Screening, conveying, washing (if required) and compaction in a single unit
- Mesh 0.5 - 1.0 mm
- Alternative: 'RoMem liquid' for 'liquid' screenings removal



*ROTAMAT® Membrane Screen ideal for removal of hairs and fibres*

### **ROTAMAT® Rotary Drum Screen RoMesh®**

- Separation of fine solids
- Removal of hairs, fibres and suspended solids
- Reduction of COD/BOD from river and sea outfalls
- Further improved performance after precipitation and flocculation
- Mesh: 0.2 - 1.0 mm
- Perforations: up to 6 mm



*ROTAMAT® Rotary Drum Screen RoMesh® with 0.2 to 1.0 mm mesh*

## ► Wastewater Screening

### ROTAMAT® Pipestrainer



*ROTAMAT® Pipe Strainer for wastewater flows of up to 5 l/s*

- ▶ Pressure filter for small municipal and industrial wastewater flows of up to 5 l/s
- ▶ Designed for installation into pressure pipelines
- ▶ Compact design
- ▶ No need for washwater, mechanical screen cleaning
- ▶ Wedge wire: 0.2 / 0.5 mm, Perforations: up to 3.0 mm

### RoDisc® Rotary Mesh Screen



*RoDisc® Rotary Mesh Screen with up to 30 discs in one unit*

- ▶ Disc filter for micro-screening of suspended solids prior to discharge into the receiving water body
- ▶ Polishing filter for clarifier effluents, and for river and sea outfalls
- ▶ Low head loss
- ▶ Reduces wastewater fees
- ▶ For flows up to 1000 m<sup>3</sup>/h mesh sizes as small as 10 µm

## ► Screenings Treatment

The first step in wastewater treatment is normally the removal of solids from the wastewater flow by means of screens. The removed screenings contain household waste, faecal matter, toilet paper and mineral solids. The screenings volume depends, not only on the separation size of the screen, but also on the type of sewer system.

The solids content of municipal screenings varies between 18 % and 25 %, depending on the type of screen. Approximately 90 % of the solids are volatile (organic).

Due to their very high water content, their heterogenous composition and unaesthetic appearance screenings must be treated before they can be disposed of.

The best method of screenings treatment is washing and compaction with a wash press. Fecal matter and other organic materials are removed and returned into the wastewater flow.

As a result, a good wash press increases the BOD<sub>5</sub> load to the biological treatment process by about 6 %.

After washing, the screenings are compacted to reduce the water content and increase the solids concentration.

Dewatering is improved by the removal of organic materials during washing. A good washpress can achieve a weight and volume reduction of up to 80 %.

A wash press reduces the mass and volume of the screenings and consequently the disposal costs.



*Unwashed screenings*

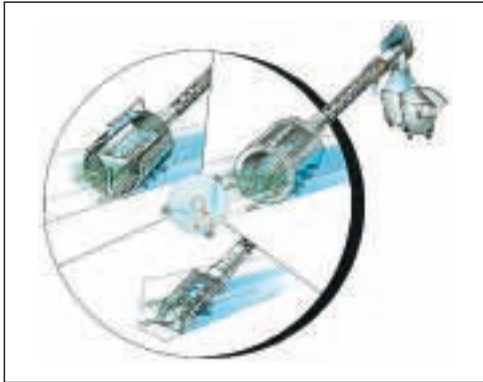


*Washed screenings*



## ► Screenings Treatment

### Integrated Screenings Washing (IRGA)



*Schematic drawing*

- Available with all types of ROTAMAT® screening systems
- Increased dewatering efficiency: Up to 40 % solids content
- Easy to retrofit
- Highly effective

### HUBER Screenings Wash Press WAP



*HUBER Screenings Wash Press WAP installed behind a STEP SCREEN®*

- Suitable for any application
- Up to 45 % solids content
- Up to 6 m<sup>3</sup>/h feed capacity

## ► Screenings Treatment

### **HUBER Screenings Wash Press WAP/HP**

- With high pressure zone
- Controlled hydraulic pressure
- Up to 55 % solids content
- Very robust design
- Low wear due to use of hardened steel materials
- Ideal for secondary dewatering



*Pressure regulation guarantees continuously high solids content*

### **HUBER Screenings Wash Press WAP/SL**

- Turbulent washing action
- Optimal washing results
- High BOD<sub>5</sub> return
- Washed screenings quality:  
< 20 mg BOD<sub>5</sub> / g DR
- Optimally suitable for launder channel feed
- Up to 50 % solids content



*Screenings Wash Press WAP/SL for best screenings washing results*

## ► Screenings Treatment

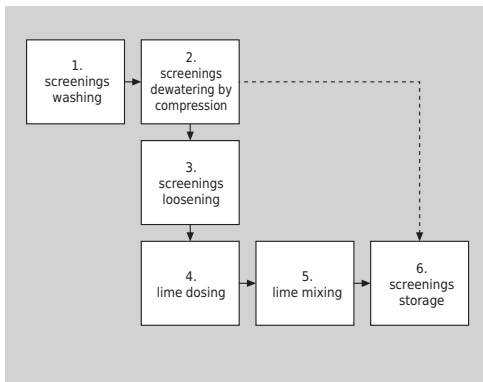
### HUBER Screenings Wash Press WAP/SL/HP



*Best screenings washing and compression in a single unit*

- Combination of super-launders and high-pressure compaction
- Up to 60 % solids content
- Up to 85 % weight reduction
- Increased thermal value
- Up to 75 % disposal cost reduction

### Screenings disinfection



*Flow diagram*

- Disinfected, odour-free screenings
- Precisely controlled dosing of lime
- Safe handling
- Up to 60 % solids content
- Completely encased system, no odour nuisance

## ► Grit Separation

For reasons of operating reliability of wastewater treatment plants it is necessary to separate the grit transported with the wastewater and other mineral materials from the digestible organic material.

Separation of grit, gravel and other mineral matter is required to increase the reliability of wastewater treatment plant operation. Good grit separation prevents operational problems, such as grit sedimentation in aeration tanks and digestors, reduces wear of equipment, such as pumps or sludge dewatering centrifuges, and avoids clogging of sludge hoppers and sludge lines.

While as much as possible of the mineral matter should be removed, as much organic matter as possible should remain in the wastewater. Testing of the grit capture rate is usually done with a grit particle size of 0.2 mm.

In combined sewer systems, approximately 60 l of grit can be removed from 1000 m<sup>3</sup> of wastewater.

The most common grit separating systems in use are grit channels, circular grit traps and vortex grit traps.

Grit is either separated by gravity sedimentation (grit channels) or centrifugal force (circular and vortex grit traps). Scrapers or screw conveyors are frequently used in grit channels for grit collection. Pumps, inclined screw conveyors or integrated grit classifying screws are used for grit removal.

Grit channels are normally provided with aeration to prevent sedimentation of volatile solids and reduce the organic content in the grit. In addition, aeration helps to float part of the fat, oil and grease. According to Kalbskopf, detention time is an important factor in the design of aerated

grit channels. However, even the best aerated grit channel cannot prevent high organic contents in the removed grit slurry. Only a good grit washer can guarantee almost complete separation of organic material from grit and produce clean grit.



## ➤➤ Grit Separation

### ROTAMAT® Complete Plant Ro 5



- Screen spacing / perforation from 0.5 mm to 10 mm
- Aerated grit chamber for 90 % capture of 0.20 mm - 0.25 mm grit particles
- For flows of up to 300 l/s
- Available as a dedicated longitudinal grit trap
- Optional available with cross flow lamella separator
- Optional available with aeration and separate grease trap

*Complete mechanical wastewater treatment in a single and compact unit*

### ROTAMAT® Complete Plant with Hydro-Duct Ro 5HD



- With a 0.5 - 10 mm screen
- Well-proven mechanical components
- High capture rate of 95 % / 0.20 mm
- With aeration and optional grease trap
- Compact unit with small footprint
- For flows up to 160 l/s
- With integrated emergency by-pass

*ROTAMAT® Complete Plant Ro 5HD with Hydro-Duct feeder – the compact wastewater treatment plant*

## ➤ Grit Separation

### **COANDA Complete Plant Ro 5C**

- Fine screen, screenings washpress, grit trap and grit classifier in a single unit
- Integrated grit washer (optional)
- Enclosed and compact unit with small footprint
- Completely enclosed unit
- For flows of up to 25 l/s.



*Complete headworks in a single, enclosed and compact unit ideal for small plants*

### **ROTAMAT® Mini Complete Plant MiniCop**

- Fine screen and grit trap in a low-cost unit
- For up to 500 PE (or flows of up to 5 l/s )
- Completely enclosed for odour control



*ROTAMAT® Mini Complete Plant*

## ➤ Grit Separation

### ROTAMAT® Circular Grit Trap HRSF



*A pair of ROTAMAT® Circular Grit Traps HRSF*

- Available with stainless steel tank or for installation into a concrete tank
- High grit capture rate due to rotating flow
- High grit separation of 95 % / 0.20 mm
- Small footprint
- Optional grease trap
- For flows up to 140 l/s

### HUBER Vortex Grit Chamber VORMAX



*HUBER Vortex Grit Chamber VORMAX*

- Installation in a concrete structure
- Reliable bull gear drive
- High grit capture rate due to controlled vortex generation
- For flows of up to 3000 l/s per unit
- Small footprint
- Inlet and outlet separated by 270° or 360° to provide for the maximum possible flow travel distance within the chamber
- Small pressure loss

## ► Grit Treatment

Grit from grit traps of wastewater treatment plants and grit from sewer and road cleaning are heavily contaminated with organic matter and debris. The high content of organic material, the wide volatile solids ratio of 10 to 80 %, is the reason why such grit slurries do not dewater well. The solids concentration remains somewhere between. The common performance criteria for the quality of grit removal are: The capture rate of 0.2 mm diameter grit particles; and the volatile solids concentration of the removed grit. The end product of excellent grit treatment is a reusable product with a volatile solids ratio of less than 3 % and a water content of below 10 %. Such grit treatment not only reduces the volume and mass of the removed grit, but also the disposal costs. If the clean grit product is reused, e.g. for road bedding, costs for grit disposal could be avoided.

### **Treatment of grit from wastewater**

For the treatment of grit from grit traps on wastewater treatment plants, HUBER grit washers have proven to be the unrivalled best option. HUBER grit washers achieve an outstanding grit product containing less than 10 % water and below 3 % volatile solids. It is so clean that beneficial use is easily possible. Equally important is that HUBER grit washers have a 0.2 mm grit particle capture rate of about 95 %. Over a thousand HUBER grit washers are successfully operating worldwide.

Regulations requiring certain grit quality criteria, depending on the kind of its disposal and/or reuse, are coming into effect in more and more countries. So far, HUBER grit washers have easily met all such requirements and will most likely do so in the future, because they have defined the industry standards.



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## Treatment of grit from sewer flushing and road refuse

The characteristics of grit from sewer flushing and from gully and road cleaning can vary widely. Their treatment must be customized, depending on required capacity, input material composition, output material quality, etc. Main process steps are: storage and balancing, debris separation, grit classifying and grit washing. Where there is no wash water supply available, wash water treatment and recirculation is an option.

Based on their wide ranging experience and expertise, HUBER Engineers will design your customized grit treatment system for your specific needs.



## ➤ Grit Treatment

### **COANDA Grit Classifier RoSF 3**

- High capture rate:  
98 % of 0.20 mm grit size
- Low organic content due to air injection
- Up to 3 t/h capacity
- Hydraulic capacity up 25 l/s
- Shafted screw with maintenance-free bearing instead of wear bars



*COANDA Grit Classifier RoSF 3*

### **COANDA Grit Washer RoSF 4**

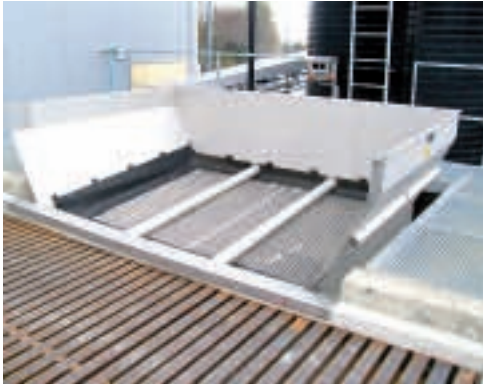
- High capture rate: 95 % of 0.20 mm
- Below 3 % volatile solids (organics) in grit product
- Will also process grit slurries from sewage treatment plants
- Up to 3 t/h capacity
- Hydraulic capacity up 25 l/s
- Shafted screw with maintenance-free bearing in place of wear bars
- 1700 reference installations
- Low grit disposal costs



*Innovative technology:  
COANDA Grit Washer RoSF 4*

## ➤➤ Grit Treatment

### External grit acceptance system RoSF 7



*Sturdy unit: external grit acceptance made easy*

- Grit acceptance system suitable for
  - Sewer grit
  - Road refuse
  - Sink pit contents
- Nonclogging construction
- Different sizes available up to 25 m<sup>3</sup> storage volume
- Variable coarse material separator
- No ponding of water inside the tank

### ROTAMAT® Wash Drum RoSF 9



*Washing of contaminated grit with the versatile ROTAMAT® Wash Drum RoSF 9*

- Raw material feeding with horizontal or vertical screw
- Removal of coarse material (> 10 mm dia.) without wear
- Low loss of mineral solids
- High solids throughput capacity
- Suitable for difficult septic sludge screening (RoFAS)

# ► Sewer System Management and Storm Water Treatment

## Equipment and systems for combined and separate sewer systems

An important part of our efforts to protect the environment in general, and our water resources in particular, is treatment of storm water and of overflows from combined sewer systems. The quality of many rivers, lakes and seas has significantly improved following the upgrading of old and construction of new wastewater treatment plants. However, despite all these efforts and investment, there is still considerable pollution of our water bodies caused by combined and sanitary sewer overflows (CSOs and SSOs) during storm events. For the purpose of specific environmental protection appropriate measures will have to be taken in future to minimize these problems.

### Screens for sewer overflows

HUBER screens are used to retain debris and other coarse solids within the sewer systems and to prevent them from overflowing into receiving water bodies during storm events. We have a variety of screens suitable for application at sewer overflows. For such applications bar screens and perforated plate screens can be selected. We offer screens that are installed upstream of, on top, or downstream of overflow weirs. The optimally suited screen is selected depending on the required or desired capture rate, flow requirement and structural conditions. Our global presence and experience allows our experts to propose the best solution to any problem.

### Flushing of storm water tanks

Suitable cleaning systems are required for sewers and storm water retention tanks and clarifiers to maintain their function and performance and to prevent odour nuisance, toxicity and safety hazards resulting from anaerobic digestion of deposits and generation of sewer gases.

The most effective, most reliable and least expensive method of cleaning sewers and storm water basins is surge flushing.

HUBER Tipping Buckets SK have been well proven for the flushing of all types and dimensions of tanks.

### Flushing of sewers

We offer an innovative and proprietary sewer flushing system with flaps. Our system offers the additional benefits of permitting controlled operation of the sewer system and full utilisation of all its volumes for stormwater retention. The system is suitable for any sewer cross-section and retrofitting without interruption of sewer operation.

## Storm water retention in sewer systems

Another HUBER focus are intelligent and efficient systems for controlled storm water retention in sewer systems. In order to save investment and operating costs, it is essential to utilize the existing sewer volumes more effectively for storm water retention by controlling the water levels within the system. In many cases, with such an intelligent approach, construction of additional retention tanks can be avoided. Pollution by unavoidable storm water overflows can be minimized by installation of storm screens.

## Discharged flow volume measurement

Monitoring the utilisation of storm water retention tanks and of overflows becomes ever more important to allow optimising the use of retention volumes and minimizing overflow occurrence and flows. It is essential to be able to measure discharged storm water flows and volumes. In the past this has not been possible where a storm screen was installed. This is now possible with our equipment.



## ➤ Sewer System Management and Storm Water Treatment

### **ROTAMAT® Storm Screen RoK 1**

- Automatically cleaned storm screen for combined and sanitary sewer overflows
- Excellent capture rate due to two-dimensional perforated plate design
- Continuous cleaning of the semi-circular perforated plate
- Minimum head loss due to installation at overflow weir invert height
- Easy retrofitting into existing structures



*ROTAMAT® Storm Screen RoK 1 installed on dry side of overflow weir*

### **ROTAMAT® Storm Screen RoK 2**

- Automatically cleaned storm screen for combined and sanitary sewer overflows
- Excellent capture rate due to two-dimensional perforated plate design
- Continuous cleaning of the semi-circular perforated plate
- Retention of all screenings on the foul water side
- A perfect solution for discharges with limited upstream head requirements
- Suitable for combining with water retention elements



*ROTAMAT® Storm Screen RoK 2 installed on foul side of overflow weir*

## ➤ Sewer System Management and Storm Water Treatment

### HUBER Storm Water Bar Screen HSW



*HSW Screen installed vertically on top of the overflow weir*

- Horizontal bars with 4 mm spacing for high solids retention
- Automatic cleaning with rakes
- High performance at a low pressure loss
- High-performance direct drive
- High operating reliability due to integrated screening chamber
- Suitable for combining with water retention elements

### ROTAMAT® Pumping Stations Screen RoK 4



*Pumping Stations Screen with heating for outdoor installation*

- Screening, vertical lifting, washing and compaction in a single and compact unit
- Prevents blocking of pumps and sewers
- Screenings dewatering and compaction
- Integrated bottom step to prevent sedimentation
- Easy retrofitting into existing structures
- Can be easily removed for maintenance above ground level

# ►► Flushing of Storm Water Tanks and Sewers

## **HUBER Tipping Buckets SK**

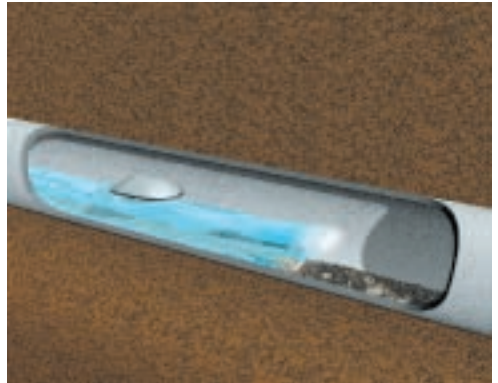
- Effective and efficient tank flushing
- Well-proven and reliable
- Improved shape for powerful and optimum flushing
- Optimized slide bearing for an easy tipping motion
- For flushing lane lengths up to 100 m



*Reliable tank flushing with HUBER Tipping Buckets SK*

## **HUBER Power Flush®**

- Guarantees effective flushing of long sewer stretches
- Self-cleansing flap gate, no blocking or sedimentation
- Utilizes additional sewer volume for storm water retention
- Ideal for sewer system management
- Can be fitted to any sewer shape
- No additional installation openings or special manholes required

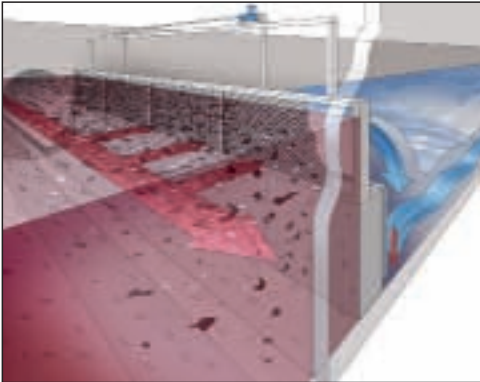


*Flushing of sewers and sewers with storage capacity and overflow*



## ➤ Combination solutions with preceding combined water screening

### Screening with controlled storm water retention



*Storm screen and adjustable overflow weir*

- Improved protection of receiving water courses due to improved utilisation of existing sewer volumes for storm water retention
- Reduced overflow frequencies and flows
- Construction cost savings due to the utilisation of unused storage capacity
- Prevention of back-flooding into the sewer network
- For new structures or retrofitting

### Screening with innovative discharged flow volume measurement



*ROTAMAT® Storm Screen RoK 2 combined with discharged flow volume measurement*

- Flow measurement downstream of storm screen
- Recording of all relevant data of overflow events
- Monitoring of overflow events by regulators
- Collecting information that is relevant for operation, service and maintenance of overflow structures

## ► Decentralized Rainwater Treatment and Ground Infiltration

### **HUBER Hydro Filt**

For a few years an increasingly decentralized retention and ground infiltration of rainwater has been discussed as an alternative to its traditional drainage into sewers.

Particularly in urban areas this is a sustainable and cost-effective alternative to or supplement for traditional collection systems.

Not only are the flows through sewers and wastewater treatment plants reduced, but ground water is replenished and natural water cycles are restored.

In view of this development, and because runoffs can be seriously contaminated with pollutants, rainwater treatment before ground infiltration or discharge into surface waters or drains becomes ever more important.

In comparison to centralized collection and treatment, decentralized treatment on-site has proven as more cost-effective and ecologically far superior.

DWA, the German Water, Wastewater and Waste Association, has published its Guideline M 153 "Recommendations for Rainwater Management" for use by municipal authorities and consulting engineers. This guideline states that runoffs from roofs that are made of uncoated copper, zinc or lead must either be infiltrated through a minimum 30 cm (12 inch) thick layer of biologically active soil, or it must be mechanically pre-treated

and then percolated through a biological filter with a sufficient retention volume.

Large surface areas are thus necessary, but usually not available in urban areas. Subsurface infiltration after rainwater treatment is normally only viable option in urban areas.

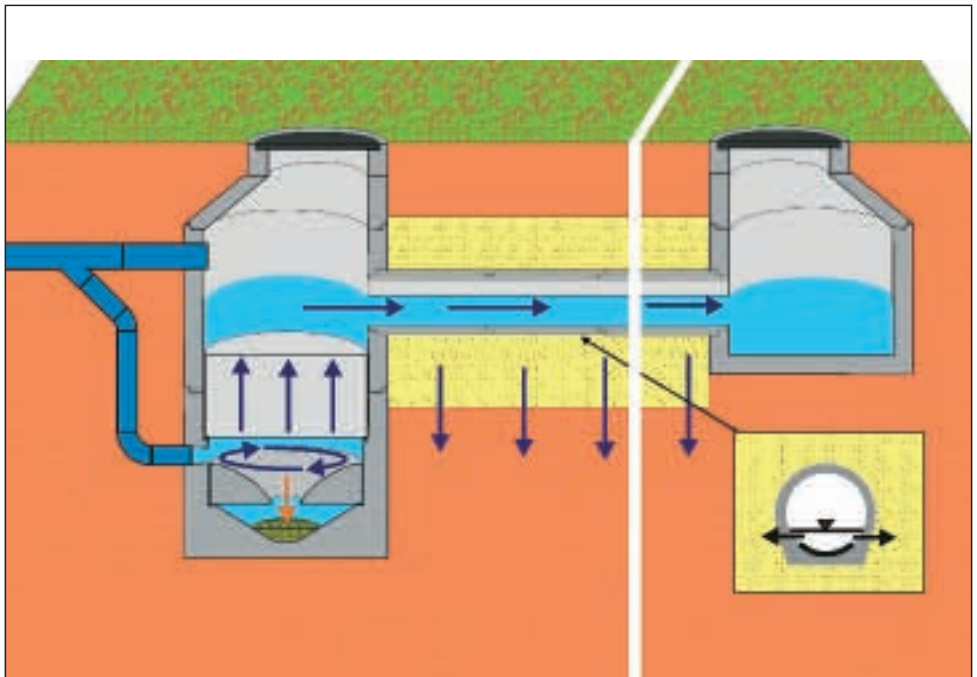
An innovative and highly effective filter system for treatment and ground infiltration of runoffs from metal roofs has been developed. The system includes an up-flow filter bed that is inserted into a special concrete chamber which is approved for ground infiltration. The filter works, in effect, as a heavy metal adsorbing ion-exchanger. A special feature of the filter is its capability to almost completely remove high pollutant concentrations occurring shortly after the beginning of rain events, the so-called first flush effect.

A further characteristic of the filter system is its easy regeneration. After the filter has been operated for a specified period and treated a certain volume of rainwater, the filter material is regenerated on-site to restore its adsorption capacity, or the filter insert is replaced with a fresh one. The filter system is inexpensive and requires little maintenance and cleaning work. Silting-up of the filter and its perforated infiltration pipe is effectively prevented by an upstream sedimentation vault that is located underneath the filter bed. After every 8 to 10 years of operation, settled

mineral particles are removed from the sedimentation vault through a standpipe and the filter bed is exchanged. The filter system also includes an emergency bypass of the filter bed. The infiltration pipe itself is also capable to retain pollutants. Pollutants are thus prevented from entering ground and groundwater under all circumstances.

### Benefits of the HUBER HydroFilt® system:

- Installation of the entire filter system below ground
- No need for any space above ground
- Silting-up of filter and infiltration pipe is prevented
- Infrequent and easy maintenance
- Inexpensive alternative to rainwater collection and centralized treatment
- Roadway installation



*HUBER Hydro Filt system with flushing shaft and concrete infiltration pipe*

## ►► Heat Recovery

### **Energy recovery from wastewater – HUBER ThermWin®**

Right below the ground, in sewers, is a hidden and seldom used source of energy: our wastewater. Generally the temperature of sewage is in the range of 12 to 20 °C. Even during winter the wastewater temperature never drops below 10 °C, or only for a few days. This makes wastewater an excellent heat source for the operation of heat pumps.

Utilisation of wastewater as a heat source is especially suitable to be applied in large buildings, such as nursing homes, hospitals, schools or swimming baths. It is also possible to recover heat from the effluent of sewage treatment plants and use it e.g. for sludge drying.

As a link between the wastewater and heat pump, a heat exchanger is required to extract the heat energy contained within the wastewater. The heat exchanger transfers the thermal energy from the wastewater to the heat pump. The innovative HUBER ThermWin® system has been developed especially for such applications. The specific feature of this system is that actual heat

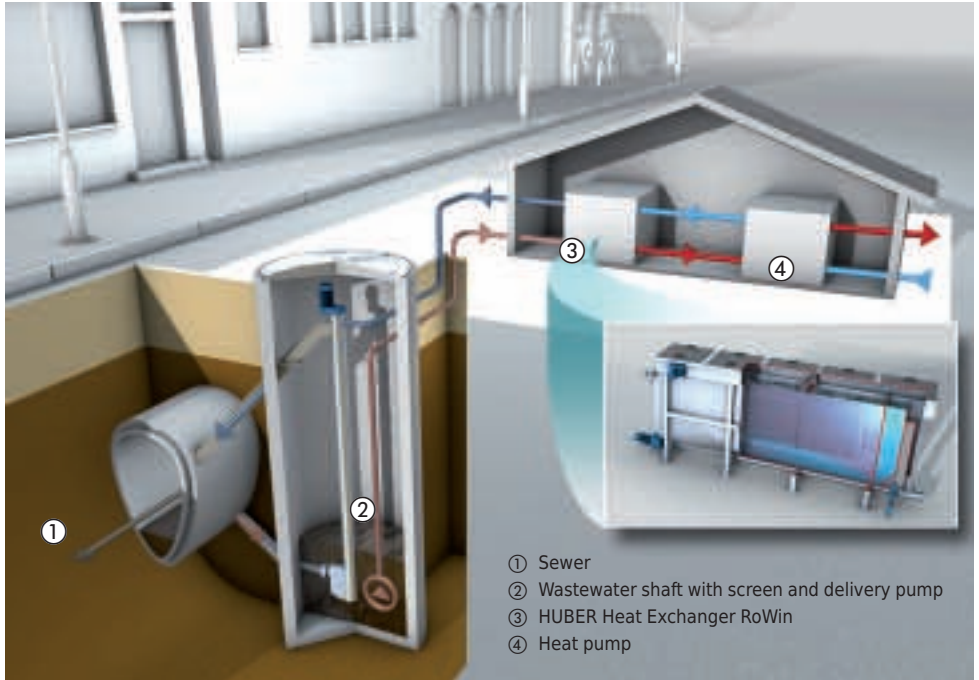
extraction from the wastewater takes place above ground and not in the sewer. All system components are easily accessible and easy to maintain.

### **Functional principle:**

A partial flow of the wastewater streaming through the sewer is passed through a screen to remove the coarse material from the wastewater flow. Preceding screening of the wastewater is necessary to prevent blocking of the heat exchanger. The pre-screened wastewater is lifted and flows by gravity through the above ground installed heat exchanger, the cooled wastewater flows back to the sewer taking along the separated screenings. Heating of the secondary circuit, which is coupled with the heat pump, takes place inside the heat exchanger. The heat pump lifts the temperature to the requested level.

For applications with contaminated media the HUBER Heat Exchanger RoWin can be used. This type of heat exchanger has been developed especially for such applications and excels with its superior heat transfer capacity and automatic preventive cleaning of the heat exchanger surfaces. Up to 80 % of the useful heat can be recovered from the wastewater and utilized economically.





*Schematic diagram of heat recovery from raw sewage by means of an above ground installed heat exchanger*

**The HUBER ThermWin® system offers the following important advantages:**

- Efficient use of a regenerative energy source
- Cost-effective, ecological system
- Fast implementation and utilisation of a rarely used resource
- Reduction of CO<sub>2</sub> emissions
- Decoupling from fossil fuel use
- Permanently available heat potential
- Long-term safe, renewable energy source
- Independence of sewer geometry
- Easy maintenance of all components
- Simple but efficient control strategy
- Cooling and heating with one single plant

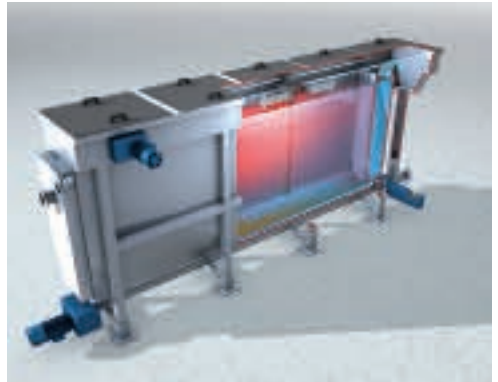
## ►► Heat Recovery

### **HUBER Heat Exchanger RoWin**

- Compact, odour-tight plant
- Continuous maximum heat transfer capacity
- Automatic cleaning of the heat exchanger surfaces
- Fully automatic operation
- Continuously stable hydraulic conditions
- Unsusceptible to floating and coarse material
- Automatic removal of sediments
- Minimum maintenance requirements
- Various possible applications in both the municipal and industrial field
- Modular design, system options available
- Very small footprint with maximum heat exchanger surface



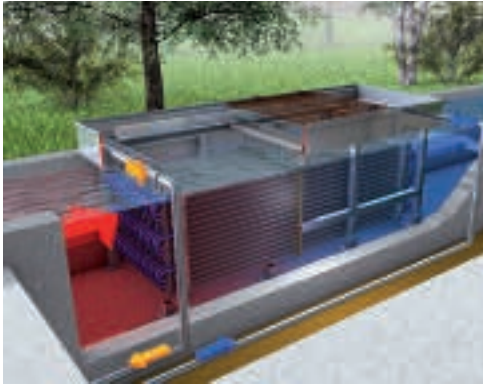
*HUBER Heat Exchanger RoWin*



*Functional model of a wastewater heat exchanger*

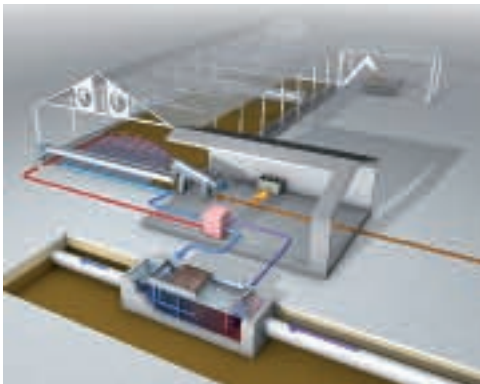
## ►► Heat Recovery

### Wastewater heat exchanger for tank or channel installation – HUBER RoWin B



*HUBER Heat Exchanger RoWin B*

- Can be installed directly in the wastewater flow
- No additional floor space required
- Ideal utilisation of the WWTP effluent
- Continuous operation of the complete system
- Variable height and width
- Low maintenance requirements
- Minimized wear
- No negative impact on sewers and wastewater treatment plants
- All year round, season-independent solar sewage sludge drying
- Fast utilisation of a rarely used resource



*Sewage sludge drying with wastewater heat*

## ► Sludge Treatment

Sewage sludge is continuously generated on municipal and industrial wastewater treatment plants during the process of organic pollutant degradation. In the past years, the annual volume of municipal sewage exceeded 10 million tons dry substance in Europe alone, and the trend continues upward. Due to the very different rates of connection in the individual countries, with e.g. a rate of virtually 100 % in the EU member states, and therefore regionally very different sewage sludge volumes it is only understandable that there are controversial approaches as regards sludge disposal ways.

In some countries, due to new legislation and eco-political consideration, some disposal methods have been prohibited or at least restricted, such as landfilling of sewage sludge. For many states the recovery of materials contained within sewage sludge still plays an important role. This applies to both landscaping and sludge spreading on agricultural land.

The fertilization effect of sewage sludge and especially its phosphorus content is normally sufficient to cover the nutrients demand of typical agricultural land. On the other hand, there are a lot of countries where the agricultural application of sewage sludge is met with much scepticism due to its potential heavy metal pollution and content of organic pollutants, such as PFT. In these countries there has been a clear trend towards concepts for thermal sewage sludge treatment for some years already, partly combined with the approach to recover the phosphorus contained within sewage sludge. Against this political and

economic background it is understandable that the sewage sludge disposal issue can be discussed quite controversially. Even if there is no generally accepted concept for future sewage sludge disposal existing presently, adequate sludge pre-treatment is required with all concepts described above.

A major pre-treatment step is to reduce the water content of the sludge. Sewage sludge generated on wastewater treatment plants typically shows a DS between 1 and 5% depending on where exactly it is generated. The average DS content of digested sludge is 45 %. This means that one cubic metre of digested sewage sludge contains 950 l, which would permanently have to be transported without prior dewatering. The major benefits of dewatering and drying are weight and volume reduction and the increased thermal value.

Consequently, the process chain that allows for later thermal utilisation of dried sewage sludge comprises the steps of prior screening, thickening and drying.

**Screening – thickening – dewatering – drying – utilisation – all from one source**



## ►► Sludge Treatment



### Sludge screening:

- Coarse material separator
- Sludge screen



### Sludge dewatering:

- Screw press
- Belt filter press



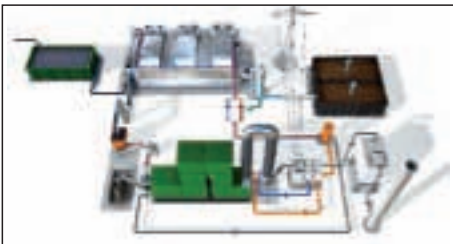
### Sludge thickening:

- Disc thickener
- Belt thickener
- Screw thickener
- Drum thickener



### Sludge drying:

- Solar dryer
- Belt dryer



### Thermal sludge utilisation

- sludge2energy



### Decentralized septic sludge treatment

- Sludge dewatering
- Filtrate treatment

## ► Mechanical Sludge Treatment

Mechanical sludge treatment primarily comprises the processes of sludge screening, thickening and dewatering.

### **Sludge screening**

Sludge screening is a mechanical treatment stage that primarily achieves homogenisation and separation of foreign matter and ensures therefore undisturbed further treatment of the sludge, irrespective of the subsequent treatment methods applied. Operating problems, such as clogging of pipelines, pumps, heat exchangers or downstream filtration units, tressing on stirrers and aeration plants, scum in settling and sludge tanks as well as damage in downstream drying units, can reliably be prevented by using HUBER sludge screens.

The STRAINPRESS® is a horizontal, pipe-shaped coarse material separator. The coarse material is separated continuously under pressure and periodical cleaning of the screening zone by backwashing is thereby not required.

### **Sludge thickening**

With regard to economical further treatment and disposal of sewage sludge, it is necessary to reduce the sludge volumes produced in the course of the wastewater treatment process. The volume reduction is achieved by separation of parts of the sludge liquor at different points in the sludge treatment process chain. The main field of application of thickening systems is volume reduction of primary and excess sludge prior to stabilisation. In addition to common sludge thickening systems, e.g. belt and drum thickeners, HUBER offers also

its optimized own developments, such as screw and disc thickeners. The selection of the most suitable technology for individual applications depends on project-specific parameters, such as throughput capacity or operating and investment costs, but also on other criteria, such as operating reliability, flexibility and process complexity.

### **Sludge dewatering**

Sludge produced in municipal and industrial wastewater treatment plants requires dewatering prior to further treatment or utilisation. In view of increasing sludge disposal costs it has become necessary to concentrate the sludge to a high solids content. HUBER offers for this purpose commonly known systems for continuous sludge dewatering, e.g. belt filter presses, but has also developed a machine for smaller and medium-sized wastewater treatment plants, the ROTAMAT® Screw Press. It is this wide range of products combined with many years of experience that enables HUBER to select the best suited technology for each individual application.

## ►► Mechanical Sludge Treatment

### Sludge Screening / Process Water Filtration



*STRAINPRESS® – continuous pressurised coarse material separation*

#### **STRAINPRESS® Sludgecleaner**

Continuous coarse material separation under pressure

- No washwater needed
- Suitable for pressure-fed pipelines (in-line installation)
- With pneumatically regulated pressure cone



*Outdoor installation of a Sludge Acceptance Plant for sludge screening*

#### **ROTAMAT® Sludge Acceptance Plant Ro 3.1**

A fine screen in a tank

- Low head loss
- High capture rate
- Robust design
- Optional outdoor installation
- Hundreds of installations
- 6 mm bar spacing

# ►► Mechanical Sludge Treatment

## Sludge Thickening

### ROTAMAT® Disc Thickener RoS 2S

- Feed capacity up to 40 m<sup>3</sup>/h
- Two sizes available
- Simple operation principle
- Minimized operator attendance
- High operating reliability
- Compact, enclosed design
- Accessible for full inspection
- Variable thickening degree
- Minimized wash water demand
- Only 3 bar wash water pressure
- Low filtrate load
- Wear-resistant stainless steel filter
- No lubrication points
- Virtually noiseless operation
- Specific power consumption < 0.02 kWh/m<sup>3</sup>
- Hundreds of installations worldwide



*Unique thickener RoS 2S*



*Installation of two units in parallel for WWTP sizes of up to 200,000 PE*

## ➤ Mechanical Sludge Treatment



*Extremely sturdy thickener RoS 2*

### **ROTAMAT® Screw Thickener RoS 2**

- Feed capacity up to 110 m<sup>3</sup>/h
- Two sizes available
- High solids capacity
- Enclosed design to eliminate odour nuisance
- Completely made of stainless steel
- Low wash water demand
- Low energy consumption



*Drum Thickener RoS D for high throughputs*

### **Drum Thickener RoS D**

- Feed capacity up to 120 m<sup>3</sup>/h
- Very high degree of thickening
- Low cost machine with high performance
- Enclosed design
- Fully automatic operation
- Low energy consumption

## ➤➤ Mechanical Sludge Treatment

### **HUBER Drainbelt DB**

- Feed capacity up to 100 m<sup>3</sup>/h
- Four sizes available
- Low polymer consumption
- Minimum operating costs
- Extremely high degree of separation
- Variable belt speeds
- Low energy consumption



*HUBER Drainbelt – Applications worldwide*

### **Sludge dewatering**

#### **HUBER Bogenpress BS**

Belt filter press

- Feed capacity up to 1000 kg<sub>DR</sub>/h
- Three sizes available
- Versatile sludge press
- High efficiency  
(low polymer and power consumption)
- High capacity (due to extended pre-dewatering zone)
- Application-optimized design



*The HUBER Bogenpress can be combined with the Drainbelt unit to further increase capacity*

## ➤ Mechanical Sludge Treatment



*RoS 3 Screw Press  
Specific power consumption < 0.01 kWh/kg<sub>DR</sub>*

### **ROTAMAT® Screw Press RoS 3**

- Feed capacity up to 500 kg<sub>DR</sub>/h
- Two sizes available
- Extremely sturdy design
- Especially suitable for industrial sludges
- Well-proven in hundreds of installations
- Virtually noiseless operation



*RoS 3Q Screw Press – Unrivalled operating reliability*

### **ROTAMAT® Screw Press RoS 3Q**

- Feed capacity up to 500 kg<sub>DR</sub>/h
- Three sizes available
- High dewatering performance
- Low energy demand
- Easy operation
- Compact, enclosed design
- Optional mobile units

## ► Thermal Sewage Sludge Drying and Utilisation

Sewage sludge disposal is becoming an increasing problem, landfilling was prohibited in 2005. Spreading sludge on agricultural land is in dispute and also humidification is no long-term solution. As all these methods cannot guarantee the reliable removal of contaminants from the material cycle, thermal utilisation remains as best possible alternative.

Sewage sludge consists of more than 95% water that requires transport, disposal or further processing. If the water content is reduced to 10% or less, costs can be reduced significantly. But a lot of energy is required for drying. The energy demand of available drying systems varies, as well as their operation and end product quality. Which system is suitable for the individual sewage treatment plant needs to be clarified for each specific case. HUBER has the suitable drying method with optimal usage of energy for any application.

### **Solar sewage sludge drying**

The basic principle is sewage sludge drying inside a greenhouse. This solution allows for continuous system operation so that the sludge bed in the greenhouse remains constant. Due to the special features of the sludge turning assembly, particularly the backmixing function, an open-pored and slightly wet sludge bed is generated that causes neither odour problems nor unnecessary dust loading.

The sludge is fed manually, with a wheel loader for example, or automatically by means of special conveying units, directly

from the dewatering system. The dried sludge can be stored in a ground deposit at the end of the drying hall or mechanically transported directly to a loading station.

The sludge turner is the heart of the HUBER SRT drying system. It consists of a rotating double shovel which is used for two different motion sequences. The sludge turning function ensures mixing, breaking up, aeration and transport of the sludge. The second function is the transport of sludge in the turner shovel, i.e. the sludge turner takes up some sludge at a defined point and transports it inside its shovel to another point. This ensures that dry sludge is back-mixed into wet sludge and sludge feeding and removal can take place at the same gable side of the hall.

The HUBER SRT system, which completely turns around the sludge as deep as down to the foundation, is not only suitable for pure solar drying but also ideal to be combined with a high performance floor heating. Optimized with such a heating, the SRT system can be used for all year round, season-independent solar sewage sludge drying. This eliminates the need for storage facilities for wet sludge and saves the floor space required for solar drying without additional heating as solar drying alone is unable to dry wet sludge during winter.



## Belt drying

The excellent product quality and reliability of the HUBER belt dryer are the results of a special sludge screening and feeding technology. The HUBER Belt Dryer BT<sup>plus</sup> operates as a multi-belt dryer at medium temperatures. The dryer is able to produce a dust-free granulate with a dry substance in excess of 90 %. Optimal usage of energy and combination of different energy sources ensures an economical dryer operation. This is an experience HUBER has made for more than 10 years, since the company started to commit itself to sludge drying solutions.

## Thermal utilisation with sludge2energy

The core part of the sludge2energy system is a high performance heat exchanger combined with a micro gas turbine that enables recovery of electrical energy from the heat of hot flue gas without the need to install a water-vapour cycle. The heat of the hot flue gases produced by incineration is emitted into the compressed ambient air by a high performance heat exchanger. The ambient air is then dissolved via a modified micro-gas turbine under generation of electric energy. The waste heat in the relieved turbine exhaust air is used for combustion air pre-heating and sewage sludge drying.



# ►► Thermal Sludge Treatment

## Sludge drying

### HUBER Belt Dryer BT<sup>plus</sup>

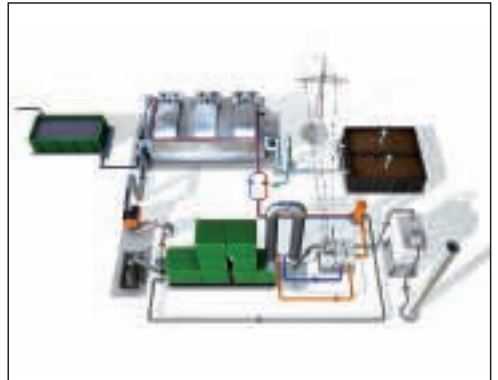
- Best available belt drying technology
- Utilisation of site-specific exhaust heat
- Simple design, easy maintenance
- Versatile biomass dryer
- Conforms to ATEX regulations



*HUBER Belt Dryer BT<sup>plus</sup> for sludge drying up to > 90 % DS*

## sludge2energy Sewage sludge utilisation

- Decentralized thermal utilisation of sewage sludge
- Energy-autarkic concept of drying and incineration
- Long-term disposal safety and cost control
- Optional phosphorus recovery from sewage sludge ash
- Supported by EU-LIFE



*Innovative concept of decentralized sludge utilisation by generation and use of thermal and electrical energy*

Gefördert durch



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Entwickelt mit



## ►► Thermal Sludge Treatment

### Solar Sewage Sludge Dryer SRT

The Solar Active Dryer SRT is a technically simple, ecological drying system with a sludge turner for sludge spreading, granulation and transport in a greenhouse construction.

- Suitable even for small sludge volumes
- Sturdy design, simple technical process
- Low primary energy consumption
- Constant sludge bed due to continuous sludge feeding
- Excellent sludge aeration through a special sludge turning system
- Modular design providing for the option of fully automatic sludge feeding and removal
- Ideal to be combined with a floor heating – no insulating sludge carpet
- True backmixing of sludge for a perfect drying bed without any odour or dust
- Maximum flexibility of sludge feeding and removal, even on the same hall gable side if requested



*Dewatered sewage sludge becomes dry granulate with the SRT system*



*Maximum sludge mixing and turning efficiency*

## ► Sedimentation / Secondary Clarification

### Equipment for Secondary Clarifiers

The inflow into **primary clarifiers** is a raw wastewater arriving from the grit trap. Organic and mineral solids are separated in the primary clarifier by sedimentation and removed as primary sludge. **Secondary clarifiers should remove as much as possible of the biological sludge, activated sludge or trickling filter sludge, from the wastewater.**

To achieve a clear effluent and an superior effluent quality meeting all standards, virtually all floating and suspended solids must be removed from the effluent and retained in the clarifier. The peak flow during storm events is critical for the design of the clarifiers. If the sludge layer rises too high there is a risk of sludge overflowing with the effluent. Sludge overflowing must be prevented in any case to comply with the consent standards.

The hydraulic pattern of the inflow into secondary clarifiers are very important for their performance. Unsited flow distribution can cause problems leading to high concentrations of suspended solids in the effluent.

A further determining factor for clarifier performance is a uniform and slow outflow of the effluent from the clarifier which can be guaranteed with a **HUBER Submerged Effluent Pipe**.

Uniform and slow overflow over a weir into an effluent channel could only be achieved, if the rim of the weir would be and remain absolutely level and if the water level would not be affected by wind. This is hardly possible in reality. If one of these requirements is not met the performance of the clarifier is not optimal. In extreme cases, the entire overflow occurs on one side of the clarifier, with high velocity, and no water overflows on the opposite side. If this happens, the flow pattern in a circular clarifier will be so badly impaired that only approx. 50 % of the tank is used, this results in hydraulic overload, in a poor clarifier performance, sludge overflow and violation of the consent standard.

## ► Sedimentation / Secondary Clarification

### HUBER Submerged Pipe



*HUBER Submerged Effluent Pipes – optimal flow pattern below the water surface*

- Uniform outflow of effluent at the entire tank circumference/width
- Permits scum collection over outlet system level
- Prevention of scum overflow
- No need for scum boards
- Minimal growth of algae on the submerged pipes due to the submersion height

### Clarifier Equipment



*Optimized clarifier equipment*

- For new constructions and refurbishment
- Corrosion-resistant and maintenance-free
- High efficiency due to individually calculable inlet and outlet systems
- Installation and service

## ► Filtration

### **Sandfiltration / Deep Bed Filtration**

The CONTIFLOW® Sand Filter is an upflow filter with a continuously cleaned filter bed, making shutdowns for cleaning or back-washing of the filter bed unnecessary.

The feed is introduced at the top of the filter and flows downward through an opening between the feed pipe and airlift housing. The feed is introduced into the bed through a series of feed radials which are open at the bottom. As the influent flows upward through the moving sand bed, the solids are retained in the filter sand. The filtrate exits at the top of the filter and flows over a weir.

Simultaneously, the sand bed, along with the accumulated solids, moves downward and is drawn into the lower end of the airlift pipe which is located in the center of the filter. The sand is lifted to the upper end of the airlift pipe where it falls through a washer which consists of several concentric stages.

A small amount of filtered water passes upward through the washer, washing away sludge from the sand, while allowing the heavier, coarser sand to fall through to the washer. By setting the reject weir at a lower level than the filtrate weir, a steady stream of wash water is assured. The continuous reject exits near the top of the filter so that it can run off by gravity.

The typically used filter bed height for municipal applications is 1 m (2 m for phosphorus removal / denitrification). Depending on the plant size, the filter tank is made of steel or concrete.

Due to the increase in requirements of the effluent quality of wastewater treatment plants – both for direct and indirect discharge – the operators of

municipal and industrial plants are forced to implement additional treatment steps to ensure the required effluent standards are met. The CONTIFLOW® Sandfilter is a solution to achieving the desired effluent standards within various applications.

### **Typical Sandfilter applications:**

- Tertiary filtration after secondary clarifiers
- Phosphorus elimination through precipitation and filtration
- Algae removal
- Partial removal of nutrients
- Process water conditioning, e.g. reverse osmosis pre-stage, or cooling water conditioning
- Drinking water treatment
- Process water treatment
- Industrial wastewater treatment

## ►► Filtration

### Filtration / Deep Bed Filtration



*CONTIFLOW® Sandfilter CFSF, stainless steel tank design*

- HUBER CONTIFLOW® Sandfilter for any flow rate, for industrial or municipal applications
- Low construction and operation costs due to continuous operation
- No external backwashing required
- Continuous or optionally intermittent grit washing
- Gravity or pump feeding
- Removal of turbidities, phosphates, nutrients



*CONTIFLOW® Sandfilter, concrete tank design*

#### **Benefits:**

- Continuous or optionally intermittent filter bed cleaning
- Grit washing with a partial filtrate flow
- The filter serves as a reactor for:
  - biological denitrification
  - chemical precipitation of phosphorus
- Optional concrete tank design
- Low operating costs

## ➤ Membrane Technology / MBR / Wastewater Reuse

### Membrane bioreactors for any throughput

#### Inexpensive wastewater disinfection

Wastewater treatment in municipal and industrial plants can require large areas, big tanks, expensive odour control equipment. Where freight and loads vary widely, the performance of the treatment processes is often poor.

All these factors result in heavy impacts in the form of contamination of our environment, very limited possibilities of water reuse, and also high construction, operation and maintenance costs.

Membrane Bio-Reactors (MBR) need by up to 70 % less volume which results in construction cost savings. MBRs have an im-

proved performance. Clarifiers are eliminated and therefore the problems that scum or sludge could overflow from a clarifier. Existing structures can be retrofitted and their performance increased. Existing primary and secondary clarifiers can be modified and used for example for storage or redundancy.

The effluent of MBR systems complies with all current standards. The effluent does not contain bacteria and other germs. It can be used as service water or for irrigation. Even a MBR permeate of drinking water quality can be achieved by adding further treatment stages.





For over a decade HUBER has been heavily involved in membrane technology for municipal and industrial waste-water treatment. In the meantime we have continuously improved the design of our original VRM® units (Vacuum Rotation Membranes), we have optimized their performance and adapted manufacturing to the increasing demand in the market. VRM® units simultaneously excel with their high capacity of in excess of 100 m<sup>3</sup>/h, low power consumption and long life.

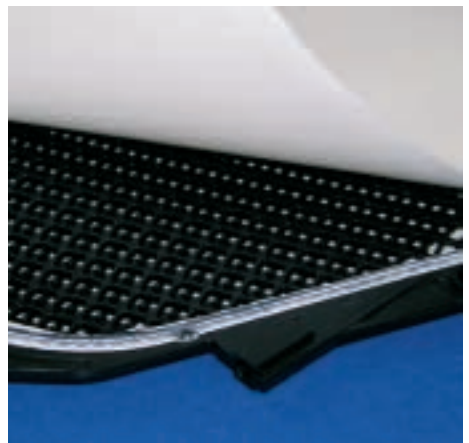
A special feature of these membrane units is their rotation that allows sequential but high-intensity air scouring of their membrane surface, with comparatively low power consumption and infrequent chemical cleaning.

Furthermore, such rotation generates swelling and pulsing pressures and therefore increases the flow rate and additionally prolongs chemical cleaning intervals. The specific scouring air flow is as low as 150 l/(m<sup>2</sup>·h) [0.008 cfm per ft<sup>2</sup>] and the scouring air pressure is only about 250 mbar [8.2 ft WC] because the scouring air is supplied to the VRM's central axis. For decentralized applications we use our highly-efficient MCB® units and HUBER BioMem® plants that include stationary membrane plates. Over 800 units are presently in operation worldwide. Both systems are available as complete solutions or optionally as components for integration into the customers' plants.

We provide all our membrane units with top-quality ultra-filtration membranes and therefore combine best effluent quality with low cleaning and maintenance costs and long life.

It is not our philosophy to offer the cheapest membrane units in the market, but high-quality products with long life and best value.

In contrast to our competitors we prefer plate membranes due to improved operational reliability, ease of maintenance and chemical cleaning, and we offer outstanding global aftersales service.



# ➤ Membrane Technology / MBR / Wastewater Reuse

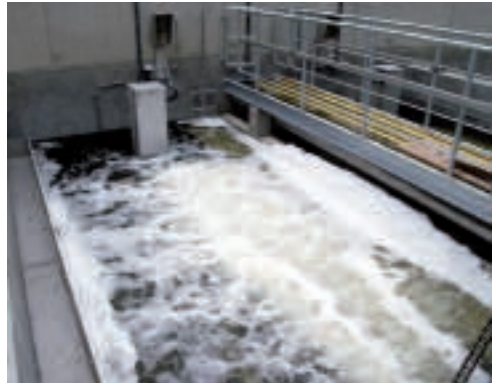
## HUBER VRM® Units – for Medium to Large Bioreactors

### HUBER VRM® filtration units

- For municipal and industrial wastewater treatment
- Energy-efficient and effective prevention of fouling by sequential air scouring
- Lower power consumption in comparison to our competitors
- Ultra-filtration membranes, retaining all particles, bacteria and germs
- Well-proven ultrafiltration membranes
- Low tendency to pore fouling
- Effluent reuse as service water
- Effluent reusable as service water or for irrigation
- Highly resistant membranes and high-quality stainless steel
- Simple and quick detection and exchange of defective membrane modules
- No requirement for regular chemical cleaning
- Effluent in compliance with the presently applicable discharge standards (e.g. European Directive for Bathing Water, US Title 22)



*VRM® 30 filtration unit installed in the filtration chamber*



*VRM® unit installed on municipal WWTP Hutthurm, 3 VRM® 30/544 units, 9.792 m<sup>2</sup> membrane surface*

## ➤ Membrane Technology / MBR / Wastewater Reuse

### HUBER BioMem® System – the Complete Semi or De-Centralized Solution



*HUBER BioMem® system for wastewater reuse  
in hotels*

- Complete treatment of sewage of up to 2,500 PE
- Effluent reusable as service water or for irrigation
- Simple and modular design for quick and easy installation
- Mobile plants in containers available
- Redundant components for high reliability
- Single-tank system with minimum pumps and blowers and simple control strategy
- Remote monitoring and service contracts available
- Effluent in compliance with the presently applicable discharge standards (e.g. European Directive for Bathing Water, US Title 22)
- Membrane regeneration twice a year
- Easy and quick replacement of defective membrane modules



*HUBER BioMem® system in container*

## ► Decentralized Wastewater Treatment with or without Reuse

### **HUBER MembraneClearBox® (MCB) for onsite sewage treatment systems**

- Decentralized wastewater treatment for housing developments, villages, resorts, etc.
- Reduced sewer construction costs (only local sewers are needed)
- Modular design permitting adaptation to specific needs
- Compact design for small footprint
- Stationary membrane plates, insusceptible to tressing with hair and fibre
- Highly resistant and durable membranes in high-quality stainless steel units
- Ultra-filtration membranes, retaining all particles, bacteria and germs
- Outstanding effluent quality, permitting ground infiltration, even in sensitive areas, or reuse as service water, e.g. for toilet flushing or irrigation
- Simple design and easy operation
- Engineered for durability, reliability and low maintenance



*MCB unit (size 150 PE) for decentralized wastewater treatment in a biosphere reserve*



*Modular design – installation with 6 modules, 84 m<sup>2</sup> membrane area*

## ► Decentralized Wastewater Treatment with or without Reuse

HUBER DeWaTec is a wholly-owned subsidiary of HUBER SE. Since 1990, the company has been active on the decentralized wastewater treatment market offering intelligent and efficient solutions.

Dependability is the trademark of our products and our reliable service. We provide customers with our expertise to ensure the durability and sustainability of our solutions for decentralised wastewater treatment. Especially the intensive training programs we offer give them a maximum benefit. Our service includes the calculation and layout of onsite treatment systems and support through our certified sales partners. A great number of patents give proof of our engineering know-how and knowledge of biological processes we achieve and ensure with our own research and development department. But our commitment does not end with product delivery, our qualified

engineers are always available for support and glad to help with answers and friendly support for a perfect after-sales service.

Global presence with a strong regional base: With our high quality, sturdy technologies for wastewater treatment we want to make an ecological and economic contribution to solving the water problems we are faced with in many regions of our world.

Our acting is governed by a high respect for a sound environment that needs to be preserved for the welfare of all of us. The economic strength, high innovative ability and international orientation of HUBER SE combined with the market presence and efficient German sales network of HUBER DeWaTec GmbH are the cornerstones of the company's economic success. They enable us to constructively meet future challenges.



## ➤ Decentralized Wastewater Treatment with or without Reuse

### **Fixed bed plant HUBER 3K PLUS®**

- Compact single-tank plant for up to 16 PE
- Solutions for up to 500 PE available
- No electrical components submerged in wastewater
- All components made of stainless steel or plastic
- Excellent efficiency in case of overload
- Over 20,000 units in operation worldwide



### **SBR plant Batch PLUS®**

- All pumping processes by means of air-lift pumps
- All technical components integrated in the control cabinet
- No electrical components submerged in wastewater
- Automatic detection of light load or holiday periods
- Conversion of carbon and nitrogen compounds



## ► Decentralized Wastewater Treatment with or without Reuse

### HUBER MembraneClearBox®



- As retrofit package for existing septic tanks or cesspools, or supplied with a new tank
- Compact and sturdy stainless steel unit
- Durable ultra-filtration membranes retaining all particles, bacteria and germs
- Outstanding effluent quality of classes C/N/D+H
- Reuse of the effluent as service water

### Package plant Batch+®

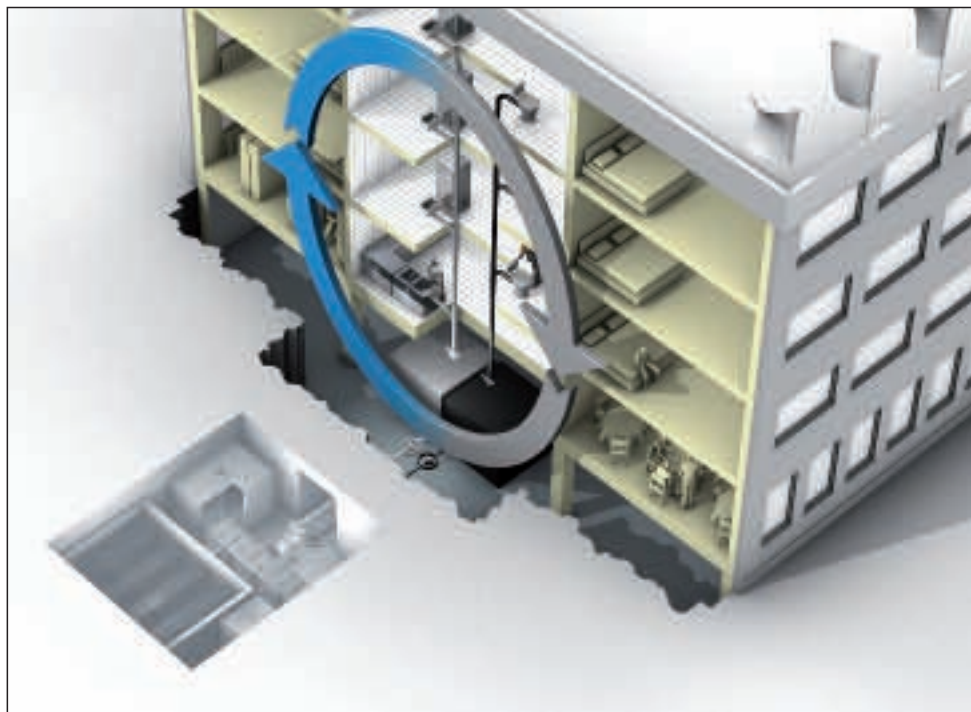


- Completely pre-assembled SBR technology in a plastic tank
- All pumping processes by means of air-lift pumps
- No electrical components submerged in wastewater
- Automatic detection of light load or holiday periods
- Conversion of carbon and nitrogen compounds
- 25 years guarantee on tank tightness

## ► HUBER Solutions for Water Reuse and Heat Recovery

Large building complexes, such as hotels, shopping malls, office or residential high-rise buildings, need high amounts of energy, heat and water. The provision of these resources costs money and pollutes the environment. Besides, warm and energy-rich wastewater is produced and frequently discharged untreated and unused to the sewer or environment. In view of the climate change the utilisation of the wastewater flow as energy and heat source has increasingly become a topic for consideration. Concepts for the reuse of service water recovered from wastewater can be realized by using innovative membrane systems. Stormwater utilisation completes the range

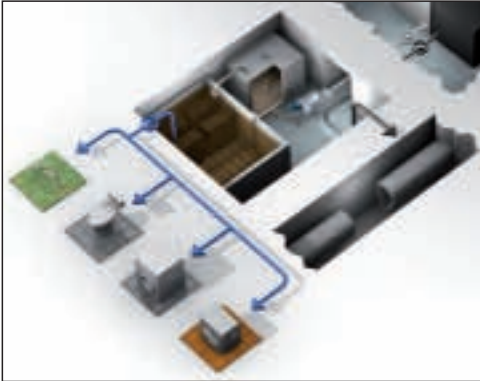
of possibilities that save resources. Economically beneficial concepts and solutions need to be developed that take into account the entire range of treatment and recovery technologies. Such concepts need to be incorporated already in the building planning phase. HUBER SE has developed such innovative concepts and solutions and is able to offer the suitable solution for any application.





## ➤ HUBER Solutions for Water Reuse and Heat Recovery

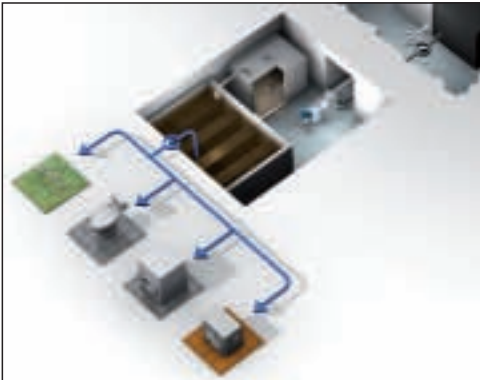
### Greywater treatment: HUBER GreyUse®



- HUBER GreyUse® Plant for greywater treatment with HUBER membrane technology
- Crystal-clear, bacteria-free, germ-free effluent
- Perfectly suitable to be reused (for toilet flushing, air conditioning systems, washing machines, irrigation).
- At least 50 % water savings
- Discharge of treatment residues into the sewer

*Solution 1:*  
HUBER GreyUse® greywater treatment plant

### Total wastewater flow treatment



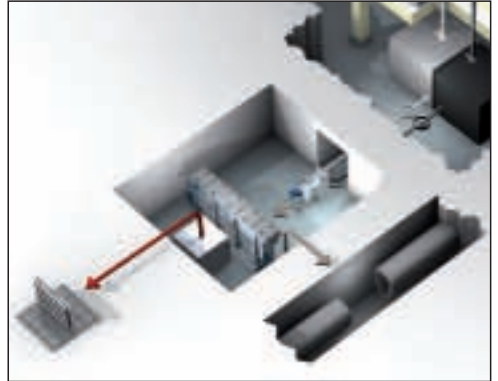
- Total wastewater flow treatment with HUBER membrane technology
- Crystal-clear, bacteria-free, germ-free effluent
- Perfectly suitable to be reused (for toilet flushing, air conditioning systems, washing machines, irrigation).
- Reuse of the complete treated wastewater flow
- Independence of sewer system
- Drastic reduction of fresh water consumption

*Solution 2: Total wastewater flow treatment*

## ➤ HUBER Solutions for Water Reuse and Heat Recovery

### Heat from wastewater: HUBER RoWin

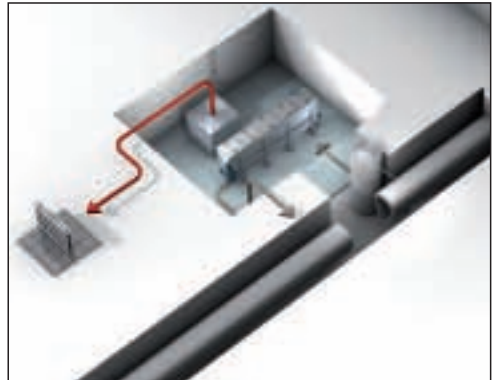
- Recovery of heat from wastewater and reuse of wastewater heat to heat buildings by means of heat pumps
- Minimized energy losses in the building
- Active environmental protection through CO<sub>2</sub> reduction
- Maintenance-free process with HUBER Heat Exchanger RoWin



*Solution 3: Recovery of heat from wastewater: HUBER RoWin*

### Heat from sewers: HUBER ThermWin®

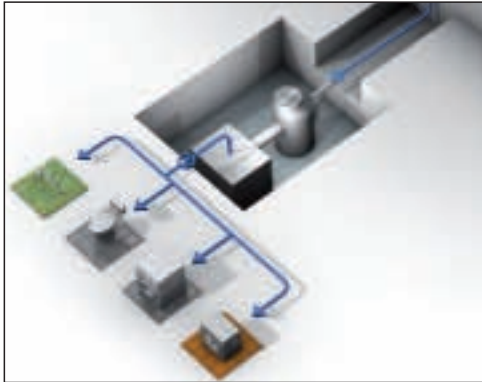
- Use of the sewage flow from the sewer as heat source for a heat pump
- Climate-friendly and economic heating of buildings
- Active environmental protection through CO<sub>2</sub> reduction
- Maintenance-free process with HUBER Heat Exchanger RoWin
- Only minor cooling of the wastewater flow required ( $\Delta T = 2K$ )
- Suitable to be used to both heat and cool buildings



*Solution 4: Recovery of heat from sewers: HUBER ThermWin®*

## ➤ HUBER Solutions for Water Reuse and Heat Recovery

### Stormwater utilisation



- Removal of pollutants and metallic particles from roof run-offs
- Retention of abraded rubber and fine sand particles contained within stormwater from roadways and parking spaces
- Installation of the clarification equipment in the concrete shaft
- Easy maintenance

*Solution 5: Stormwater utilisation*

**HUBER** offers complete solutions for the treatment and reuse of grey wastewater and the total wastewater flow by means of innovative membrane technology.

**HUBER** is leading with technically mature and low maintenance plants and systems for the recovery of heat from wastewater.

## ► Industrial Wastewater Treatment

You earn your money with the production and sales of your products or generation of energy, e.g. biomass energy. Although the treatment of production wastewater and sludges is not your core business, ecological awareness is part of your business philosophy.

You are therefore looking for a partner who is able to develop and implement in collaboration with you economically reasonable wastewater and disposal concepts.

### **We understand your needs!**

HUBER SE is one of only a handful of suppliers worldwide who supply not only the equipment for wastewater and process water treatment but also sludge treatment technology. We are able to generate complete processes with our HUBER machines and plants, in other words: we offer complete systems and assume the process engineering responsibility for these systems.

However, wastewater treatment alone is not enough. The next step to take is 'Close The Loop!'

The treatment of clarified wastewater to high quality service water for production processes saves expensive potable water and avoids wastewater.

Our philosophy of leaving no resource unused also includes production sludge. Sludge treatment and utilisation is an aspect to be taken into account with any holistic approach. This should not only include cost-effective disposal of sludge but also its energetic utilisation.

So you see, there is a variety of approaches for converting a costly wastewater project into a profitable water treatment and sludge utilisation project.

Our industry team who are specialists, having acquired their specific knowledge in a variety of successful projects, will be pleased to support you with their expertise.

### **Let us work together with you to develop your projects!**

## ► The Benefits of a HUBER Dissolved Air Flotation Plant HDF



- With optional chemical treatment stage
- Standardized sizes for different applications
- Compact design, small footprint
- Simple pressure release principle by means of a single valve for maximum operating reliability
- Efficient, gentle mixing of the air bubbles into the wastewater flow
- Defined tank flow due to the optimal design of the blending and feeder construction in the flotation tank
- Large effective clarifier area due to the lamella separator, minimized risk of blocking due to suitably dimensioned gaps between the lamella plates
- Generation of saturated pressure water with a multi-stage pump which is not subject to the pressure tank regulation
- Experience from hundreds of installations in a variety of fields of application

# ►► Industrial Wastewater Treatment

## **Beverage industry:**

- Breweries
- Malt factories
- Mineral water industry
- Fruit juice industry

## **Processes**

- Screening
- Filtration
- Membrane bio-reactors
- Sludge treatment



*HUBER ROTAMAT® Rotary Drum Fine Screen Ro 2 with 1 mm bar spacing and moveable high pressure cleaning system*

## **Slaughterhouses / meat processing:**

- Cattle, pigs, poultry
- Ready-to-eat products

## **Processes**

- Coarse screening > 6 mm
- Fine screening > 1 mm
- Dissolved air flotation
- Filtration
- Paunch manure press
- Screening of wash water from cattle truck washing
- Membrane bioreactor
- Sludge treatment



*HUBER Dissolved Air Flotation Plant HDF with chemical treatment stage*

## ►► Industrial Wastewater Treatment



*HUBER ROTAMAT® Micro Strainer with 1 mm bar spacing and HUBER Dissolved Air Flotation Plant HDF*

### **Food industry:**

- Candy industry
- Delicatessen / salads
- Bakeries

### **Processes**

- Screening
- Dissolved air flotation
- Filtration
- Membrane bio-reactor
- Sludge treatment



*HUBER ROTAMAT® Complete Plant Ro5K with integrated 1 mm pre-screening*

### **Fruit and vegetable processing:**

- Fruit juice concentrating
- Canning industry
- Potato processing

### **Processes**

- Screening with grit trap
- Filtration
- Membrane bio-reactor
- Sludge treatment

# ► Industrial Wastewater Treatment

## **Fish industry**

- Fish meal production
- Slaughtering and processing
- Deep freezing and packing industries

## **Processes**

- Screening
- Dissolved air flotation
- Membrane bio-reactor
- Sludge treatment



*HUBER ROTAMAT® Micro Strainer Ro9 with 3 mm perforations*

## **Dairies:**

- Milk
- Cheese
- Butter
- Yoghurt

## **Processes**

- Screening
- Grit/grease removal
- Dissolved air flotation
- Membrane bio-reactor
- Sludge treatment



*HUBER VRM® Bio-reactor*



## ►► Industrial Wastewater Treatment



*HUBER ROTAMAT® Screw Press RoS3*

### **Wood and paper industry:**

- Waste paper recycling
- Pulp mills
- Paper manufacturing
- Fresh water conditioning

### **Processes**

- Coarse material and grit separation, sedimentation
- Fibre recovery, process water treatment
- Filtration of suspended matter
- Dissolved air flotation
- Membrane bioreactor
- Sludge treatment



*HUBER Grit Treatment System RoSF 5  
in Cridec, Switzerland*

### **Grit treatment:**

- Grit from road sweepings
- Grit from sewer flushing
- Grit from grit traps and oil separators
- Grit from gullies

### **Processes**

- Grit receiving stations
- Coarse material separation
- Grit classification and washing
- Complete washwater treatment and recycling

# ➤ Industrial Wastewater Treatment

## **(Bio-)waste treatment**

- Biological waste treatment
- Mechanical-biological solid waste processing
- Hazardous waste treatment
- Landfill leachate

## **Processes**

- Liquid waste receiving station
- Coarse material and grit separation
- Thickening and dewatering of digested organic waste
- Process water treatment
- Wastewater treatment in MBR
- Sludge treatment



*HUBER ROTAMAT® Complete Plant Ro5 BIO installed at an organic waste fermentation plant*

## **Textile and leather industry**

- Tanneries
- Laundries
- Textile finishing
- Textile processing

## **Processes**

- Wastewater screening
- Grit separation
- Process water treatment
- Wastewater treatment with MBR
- Sludge treatment



*ROTAMAT® Complete Plant Ro5K in a textile industry (jeans production)*

## ➤ Industrial Wastewater Treatment



*Sludge and wastewater treatment in a refinery in the UAE*

### **Chemical industry**

- Pharmaceutical industry
- Refineries
- Chemical industry

### **Processes**

- Cooling and fresh water treatment
- Process water treatment
- Coarse material separation from liquids
- Wastewater treatment with MBR
- Sludge treatment

## ➤ Solutions in the fields of

### **Plastic material recycling**

- Wash water treatment
- Sludge treatment

### **Automobile industry**

- Cooling and fresh water treatment
- Wastewater pre-treatment
- Process water treatment
- Sludge treatment

### **Primary and construction industry**

- Treatment of water from construction sites
- Wash water treatment
- Sludge treatment

### **Marine applications**

- Wastewater screening

### **Power plants**

- Cooling water screening
- Sludge treatment

### **Iron and steel industry**

- Cooling water screening
- Process water treatment

### **Metal processing industry**

- Process water treatment
- Sludge treatment

## ► Stainless Steel Equipment

HUBER stainless steel products are ideal for water and wastewater treatment applications – whether municipal or industrial. It is the material complying with the strictest requirements:

- Unparalleled life
- Optimal corrosion protection after passivation by pickling in an acid bath
- Standardisation saves costs and simplifies design
- Excellent hygienic characteristics for health and safety

It is our objective to offer perfect products to our customers. Our well-trained and highly motivated employees manufacture our products in our state-of-the-art stainless-steel only factory to guarantee consistently high product quality.

We have the philosophy that a high degree of vertical manufacturing integration is in the best interests of our customers.

To prevent any cross-contamination of our stainless steel products with carbon steel rust and dust, we use only stainless steel in our factory. Our machinery and manufacturing processes are specifically designed for the material stainless steel. Every stainless steel product, before it leaves our factory, is passivated by full submergence in an acid (pickling) bath for perfect surface finishing and corrosion protection.

Potable water is a most important resource that should be available for all people in sufficient quantity and quality. We offer the highest quality products for the treatment of drinking water.

Drinking water must be pure, i.e. clear and free of pathogens, odour and colour. To comply with these requirements certain standards have to be met during collection, treatment and distribution of the drinking water.

Many waterworks, however, do not meet these standards and are a danger to our health and environment. It is important to identify such risks as early as possible to prevent further damage.

We have developed systems for waterworks that prevent contamination of drinking water, such as special air filtering systems. As the water level in drinking water reservoirs changes, air is drawn in and out. If the air entering the reservoir contains particles, micro-organisms like germs, spores, pollen or fungi, the drinking water becomes contaminated. Our air filter systems, with integrated filter media, retain dust and other fine particles and therefore prevent contamination and health hazards.

All Huber products are made of stainless steel and exceed the latest standards and quality requirements. If stainless steel products are manufactured and treated according to best practice, they will provide excellent performance for many, many years of use.



## ►► Stainless Steel Equipment

### Manhole equipment

- Round and rectangular stainless steel manhole covers
- Easy to handle, no maintenance
- Safety steps and ladders for any application



*HUBER manhole cover*

### Doors and gates

- Safe access to drinking water structures
- For any application, water tight up to a pressure of 10 m water depth
- Attack-proof in accordance with DIN V EN V 1627



*Pressure door installed for flood protection*

## ►► Stainless Steel Equipment

### Pipe fittings



*Perforated feed pipe*

- High quality due to pre-fabrication
- Even the most complicated fittings can be manufactured
- Smooth and hard stainless steel surface preventing contamination with germs

### Wall ducts



*Flush with the wall*

- High quality sealing against liquids and vermin
- Allows pipe retrofitting
- Allows axial pipe movement
- Direct flanging option

## ►► Stainless Steel Equipment

### **Railings, ladders, walkways**

- Safety on all ways
- Customised for specific applications
- Pickled in an acid bath for perfect finishing and corrosion protection



*High quality stainless steel railing*

### **Clarifier equipment**

- For new and existing clarifiers
- Corrosion-resistant and maintenance-free
- High efficiency due to individually optimised inlet and outlet systems
- Installation and service



*Optimal equipment for sedimentation tanks*



## ►► Stainless Steel Equipment

### Hygienic conditions in drinking water reservoirs



*HUBER air filter for clean drinking water*

- Prevents contamination of drinking water during storage and distribution
- Clean air = clean water
- Pathogen retaining filters

### Elevated water reservoirs



*Drinking water reservoir with HUBER equipment*

- Complete equipment for drinking water reservoirs
- Prevention of unauthorised access in compliance with international security standards

## ► Global Lifecycle Service

We consider it our responsibility to offer our customers throughout the whole product life cycle any after-sales services required to ensure optimum plant operation after the purchase of a high quality HUBER product. Because only the optimal handling and operation of a product results in the economic benefit for the customer he rightly can expect from a superior technology:

- high performance
- low, calculable operating costs
- high operating reliability
- long product life

HUBER Global Service offers

- each HUBER customer
- for any HUBER product
- at any site in the world

expertise in service excellence provided by qualified contact partners in our service centres worldwide and experienced service staff on site.

Whether original HUBER spares, inspection and maintenance work carried out by factory-trained HUBER service staff, systematic optimisation of plant operation,

individual project-specific consultancy service or plant operator support on site provided by our service specialists – we are always at the side of our customers and their machines and plants, worldwide and a product life long.

**HUBER Global Service – Maximum service quality for superior HUBER products and HUBER solutions.**

## ► Global Lifecycle Service

### HUBER Installation and Commissioning Service



*HUBER installation and commissioning service*

Rely on our qualified service staff for installation and commissioning! Their expertise and extensive knowledge ensures the best start for your new HUBER product.

### HUBER Spare Parts Service



*HUBER spare parts service*

Our service team in Germany is available with advice and support in the selection of the best original spares and wear parts for your machine. A large stock holding guarantees high availability of essential spare parts for your HUBER product.

## ►► Global Lifecycle Service

### **HUBER Repair Service**

Prompt and expert repairs minimise expensive down time.

The highly flexible HUBER service team with their professional competence provides everything required to allow for perfect equipment operation, whether on site or in the HUBER factory.



*HUBER repair service*

### **HUBER Maintenance Service**

Preventative maintenance is without doubt more economical than reactive maintenance!

We offer a wide range of customised service packages, for all markets and industries to ensure maximum performance is achieved in terms of operating reliability and costs.



*HUBER maintenance service*

## ► Global Lifecycle Service

### HUBER Optimisation Service



*HUBER Optimisation Service*

Optimally customised machines guarantee a consistently high performance at low operating costs. The operating conditions of plants frequently change significantly in the course of time without being noticed. The analysis of operating hours, cycle times, consumption of energy and consumables, degree of wear, etc., often leads to the result that a significantly improved plant efficiency can be achieved through equipment optimisation.

### HUBER Teleservice



*HUBER Teleservice*

The installation of a HUBER teleservice system enables our service specialists to daily check all important operating parameters and immediately notify the customer in case of any deviation. As an option teleservice systems are available that report deviations automatically and actively for maximum safety and operation efficiency.

## ► Global Lifecycle Service

### **HUBER Service for products from other manufacturers**

One contact person for all requests:  
HUBER Service.

We offer an extensive and professional service for products from other manufacturers, comprising spares, repair and equipment optimisation. A clear logistic and economical benefit for our customers!



*HUBER Service for products from other manufacturers*

### **HUBER Consultancy Service International**

Our service consultants visit you on site to provide maximum support, including valuable information about optimal service measures and reliable operation at reduced operating costs.



*HUBER Consultancy Service International*

## ► Global Lifecycle Service

### HUBER Refurbishing Service



*HUBER Refurbishing Service*

It may often be more cost effective to refurbish an existing plant than build a new one.

Our service specialists provide detailed technical analysis on site, including an economic evaluation and offer customised solutions.

The ideal implementation of the selected solution on site will be guaranteed by our qualified service technicians.

### HUBER Training Service



*HUBER Training Service*

A well-briefed operating staff is a pre-requisite for ideal and economical plant operation.

Whether you want to improve the knowledge of your staff, or train new employees, we offer tailor-made workshops both on site or in our local HUBER service centre.



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