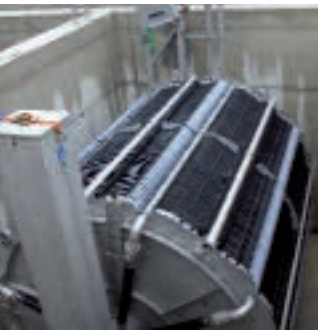



HUBER TECHNOLOGY
WASTE WATER Solutions

Innovative Products
Worldwide


TECHNO

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, 600 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 aquired 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. If you wish to discuss your needs, please ask our experts for advice and support.

Fields of Activity

Wastewater Screening

Screens for any application

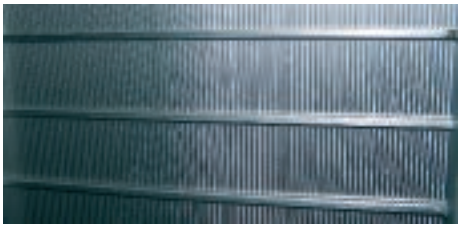
Screening is indispensable as the first step of municipal and industrial wastewater treatment.

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.

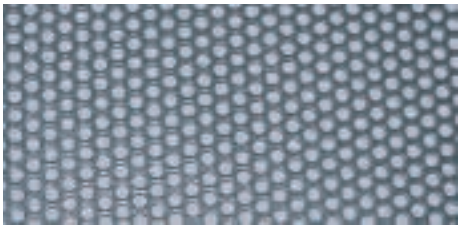
Based on the same ROTAMAT® principle "screening – washing – conveying – dewatering in a single unit" a family of ROTAMAT® screens has been developed and successfully introduced in the global market of wastewater treatment. In recent years the STEP SCREEN® and the MAX® families have been added. We offer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

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

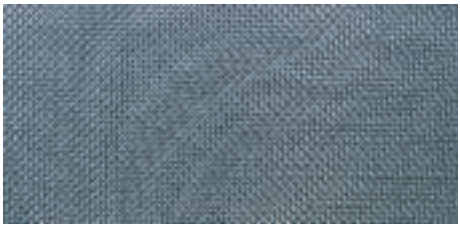
Coarse Screen



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. Frequently, raw wastewater is only treated mechanically prior to being discharged to rivers or seas. Reduction of the COD/BOD loads from such outfalls is required for the protection of the receiving water bodies if their self-cleaning capacity is insufficient.

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

HUBER TrashMax® Screen

- High-capacity screen rakes
- High operational safety due to efficient and reliable bar rack cleaning
- Reliable removal of even bulky coarse material
- Bar spacing > 20 mm

Robust screen for coarse material removal: HUBER TrashMax® Screen

Multi-Rake Bar Screen RakeMax®

- High screenings capacity
- Low head loss
- Low installation height above operating floor, even with deep channels
- Bar spacing ≥ 1 mm

RakeMax® Screen – robust design for reliable operation

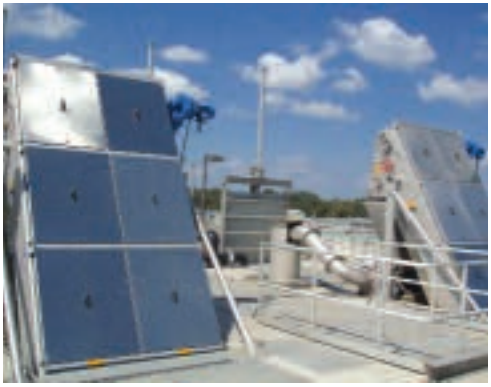
Wastewater Screening

RakeMax®-hf Multi-Rake Bar Screen hf

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

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

Belt Screen EscaMax®



Belt Screen EscaMax® – versatile headworks screen

- 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 ≥ 3 mm

Wastewater Screening

Curved Bar Screen CurveMax®

- No submerged moving parts
- Low headloss due to the large effective bar rack surface
- Bar spacing ≥ 1 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 ≥ 6 mm

ROTAMAT® Fine Screen Ro 1 for channel or tank installation

Wastewater Screening

ROTAMAT® Rotary Drum Fine Screen Ro 2 / RPPS

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

- 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 or perforated plate

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: 1 - 6 mm

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

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

- 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® Screw Conveyor Ro 8 / Ro 8t

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

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

Wastewater Screening

ROTAMAT® Membrane Screen RoMem®

- Removal of hairs and fibres upstream of membrane bioreactors
- Protection and improved operation of membrane bioreactors
- Easy retrofit into existing channels
- Screening, conveying, compaction and dewatering in a single unit
- Mesh 1.0 mm

ROTAMAT® Membrane Screen ideal for removal of hairs and fibres

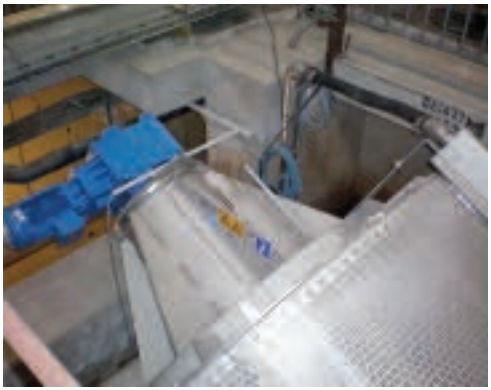
ROTAMAT® Rotary Drum Screen RoMesh®

- 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® Membrane Screen RoMem liquid



ROTAMAT® Membrane Screen RoMem liquid

- Removal of hairs and fibres to protect downstream membrane filtration plants
- COD and BOD removal prior to river or sea outfall applications
- Easy retrofit into existing channels
- Suction and transport of sludgy screenings for further treatment (e.g. combined treatment with sewage sludge)
- Mesh 0.2 - 1.0 mm
  Perforations 1 - 3 mm

RoDisc® Rotary Mesh Screen

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

- Micro screen for reliable removal of suspended solids
- Reduction of filterable solids and COD/BOD/P concentrations in the WWTP effluent
- Polishing filter for clarifier effluents, and for river and sea outfalls
- Gravity flow system low head loss
- Can reduce wastewater fees
- For flows up to 2000 m^3/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_5 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 12 m³/h feed capacity
- Completely made of stainless steel

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_5 return
- Washed screenings quality: < 20 mg BOD_5 / 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-launder and high-pressure compaction
- Up to 60 % solids content
- Up to 85 % weight reduction
- Increased thermal value
- Up to 75 % disposal cost reduction

HUBER Wash Press Launder WAP- L for launder channel operation

Redundant operation and optimal screenings dewatering with launder channel feeding system

- Screenings wash press for increased dewatering with launder channel feeding system
- Up to 45 % solids content
- Up to 12 m^3/h feed capacity
- Individually adaptable discharge situations due to flexible launder channel arrangement
- Up to 40 m launder channel length

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 digestable 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^3 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

Complete mechanical wastewater treatment in a single and compact unit

- 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

ROTAMAT® Complete Plant with Hydro-Duct Ro 5HD

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

- 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

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® Complete Plant with integrated grit washing plant

- Complete mechanical wastewater pre-treatment in a single and compact unit
- Innovative grit washing
- Grit washer easy to integrate in all aerated complete plants
- Organics in washed grit < 3 % (loss on ignition)
- Low water consumption
- Reduced disposal costs
- Compact, space-saving unit

Grit washer integrated in the grit trap

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.

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

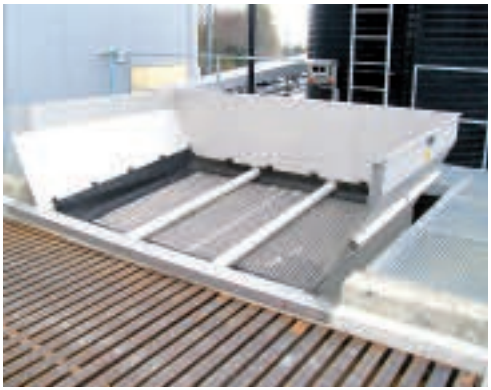
COANDA Grit Washer RoSF 4

- 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^3 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

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 it to the wastewater treatment plant after the storm event.

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 benefit of achieving lasting cleaning results of even long sewers due to powerful and long flushes. This avoids costs for mobile sewer cleaning. Also the dry weather flow can be used for regular sewer flushing to prevent sedimentation in affected sewer sections. The system is suitable for any sewer cross-section and normally also for 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 occurance 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 verticalyl 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

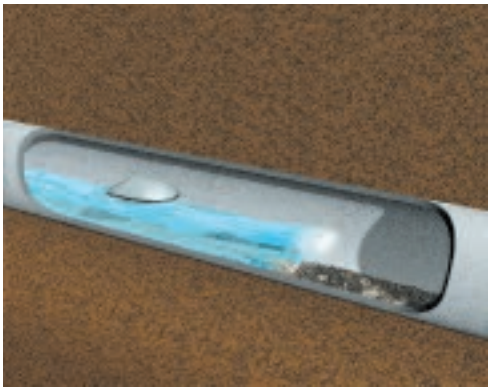
HUBER Tipping Buckets SK

- 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®

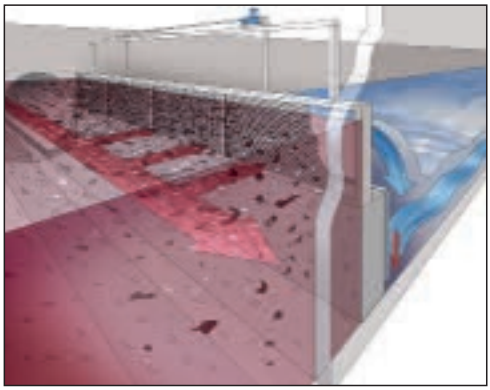
- Guarantees effective flushing of long sewer stretches
- Self-cleansing flap gate, no blocking or sedementation
- Utilizes additional sewer volume for storm water retention
- Ideal for sewer system management
- Can be fitted to any sewer shape
- No additional installation openings or special manholes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

Heating and Cooling with Wastewater

Energy recovery from wastewater

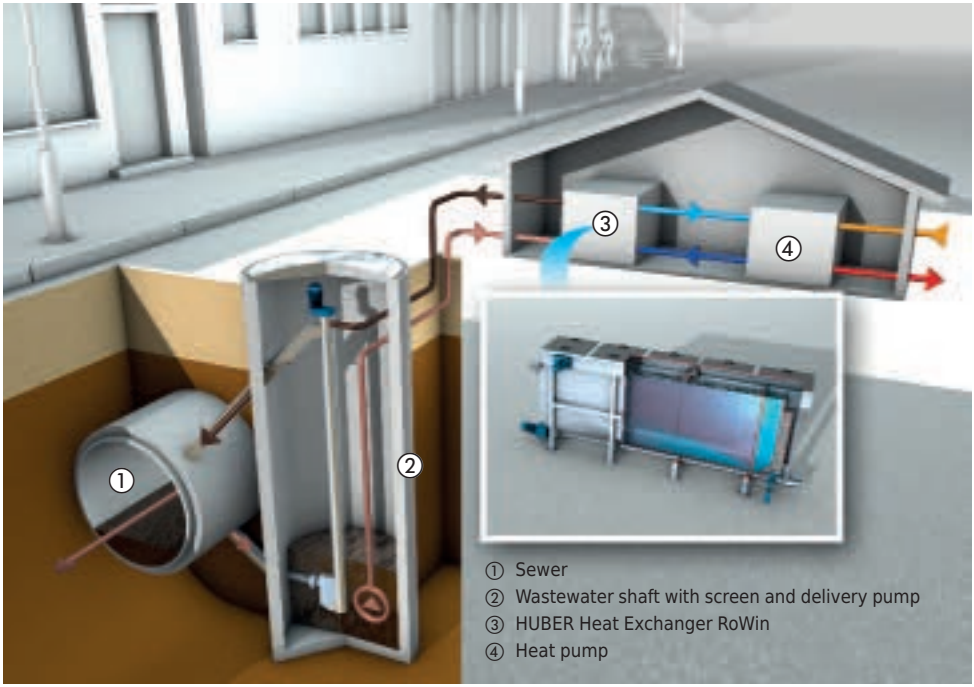
Right below the ground, in sewers, is a hidden and seldom used source of energy: our wastewater. Generally the temperature of sewage is in the range of 12 to 20 °C. Even during winter the wastewater temperature never drops below 10 °C, or only for a few days. This makes wastewater an excellent heat source 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 which has been developed especially for such applications uses the HUBER RoWin Heat Exchanger. 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. For the exchange of heat directly in the sewer we have developed the HUBER TubeWin Heat Exchanger so that we can offer a suitable heat exchanger for any application.

Functional principle of the HUBER ThermWin®:

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 prescreened 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:

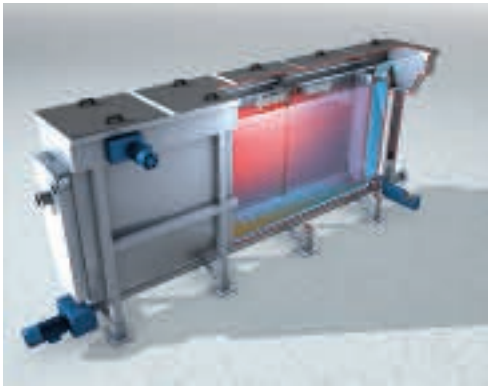
- Efficient use of a regenerative energy source
- Cost-effective, ecological system
- Fast implementation and utilisation of a rarely used resource
- Reduction of CO_2 emissions
- Decoupling from fossil fuel use
- Permanently available heat potential
- Long-term safe, renewable energy source
- Independence of sewer geometry
- Easy maintenance of all components
- Simple but efficient control strategy
- Cooling and heating with one single plant

Heating and Cooling with Wastewater

HUBER Heat Exchanger RoWin

- Compact, odour-tight plant
- Continuous maximum heat transfer capacity
- Automatic cleaning of the heat exchanger surfaces
- Fully automatic operaiton
- 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

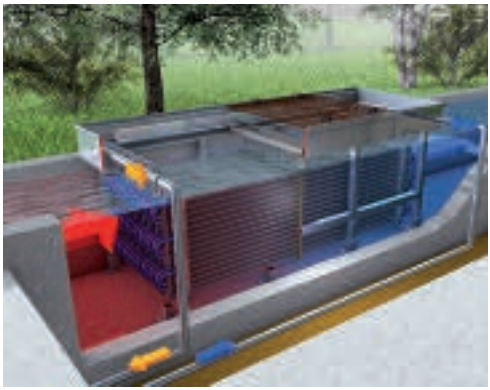
HUBER Heat Exchanger RoWin



Functional model of a wastewater heat exchanger

Heating and Cooling with Wastewater

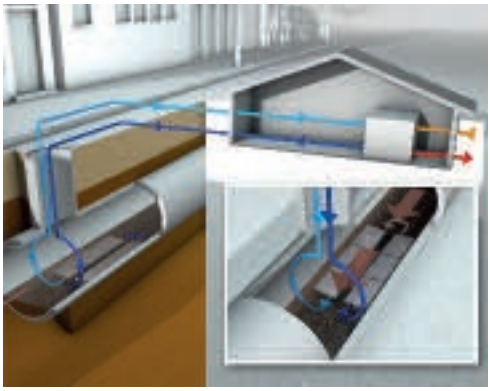
Wastewater heat exchanger for tank or channel installation – HUBER RoWin B



HUBER RoWin B Heat Exchanger

- 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

Heat Exchanger HUBER TubeWin



HUBER TubeWin Heat Exchanger

- Installation on the sewer bottom
- Flat, robust heat exchanger
- Modular design
- Low pressure loss
- Minimised sewer cross section narrowing
- Suitable for > DN 1000

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:

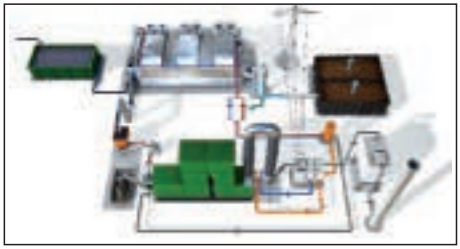
- Screw press
- Belt filter press

Sluge thickening:

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

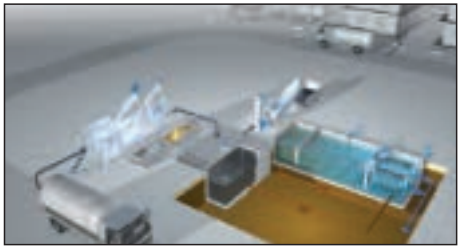
Sludge drying:

- Solar dryer
- Belt dryer



Thermal sludge utilisation

- sludge2energy



Dezentralized 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

- Throughput capacity up to 100 m³/h
- Continuous coarse material separation under pressure
- No washwater needed
- Suitable for pressure-fed pipelines (in-line installation)
- With pneumatically regulated pressure cone
- Completely made of stainless steel

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 m³/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/m³
- Hundreds of installations worldwide

Unique thickener RoS 2S

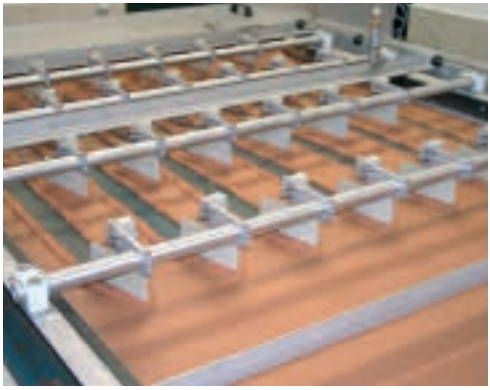
Installation of two units in parallel for WWTP sizes of up to 200,000 PE

Mechanical Sludge Treatment

Extremely sturdy thickener RoS 2

ROTAMAT® Screw Thickener RoS 2

- Feed capacity up to 110 m³/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



HUBER Drainbelt – Applications worldwide

HUBER Drainbelt DB

- Feed capacity up to 100 m³/h
- Four sizes available
- Low polymer consumption
- Minimum operating costs
- Extremely high degree of separation
- Variable belt speeds
- Low energy consumption

Mechanical Sludge Treatment

Sludge dewatering

HUBER Bogenpress BS

Belt filter press

- Feed capacity up to 1000 kg_{DR}/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

ROTAMAT® Screw Press RoS 3

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

RoS 3 Screw Press
Specific power consumption< 0.01 kWh/kg_{DR}

Mechanical Sludge Treatment

Two RoS 3Q Screw Press units installed in parallel

ROTAMAT® Screw Press RoS 3Q

- Feed capacity up to 500 kg_{DR}/h
- Four sizes available
- High dewatering performance
- Low energy demand
- Easy operation
- Compact, enclosed design
- Optional mobile units

RoS 3Q Screw Press – mobile unit for on-site testing

ROTAMAT® Screw Press RoS 3Q Mobile demo unit

- Original scale demo unit
- Complete with dosing station, pumps, mixer, etc.
- Customer support from HUBER service experts available
- Reliably predictable throughput, dewatering results, polymer consumption

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 its use for landscaping 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 backmixed into wet sludge and sludge feeding and removal can take place at the same gable side of the hall.

The HUBER SRT system is not only suitable for pure solar drying but also ideal to be combined with a high performance floor heating or hot air blower. 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 pelletising technology. The HUBER Belt Dryer BT operates as a two-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

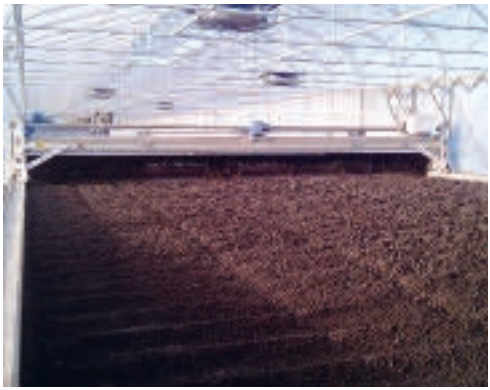
The core part of the sludge2energy system is decentralised sewage sludge drying combined with mono-incineration of sewage sludge. In the pilot project Straubing a medium temperature belt dryer has been combined with a grate stoker furnace and completed with a micro gas turbine to achieve an energy-self sufficient utilisation proces of drying and incineration. Each HUBER sludge2energy system is tailored to meet specific customer require-ments and site conditions. This guarantees optimum economic efficiency and maximum reliability of operation.

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 from 1,000 t/a
- Sturdy design, well-proven technology, simple technical process
- Low primary energy consumption
- 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
- Modular design providing for the option of fully automatic sludge feeding and removal
- Optional use of exhaust heat to support solar drying



Dewatered sewage sludge becomes dry granulate with the SRT system

Maximum sludge mixing and turning efficiency

Thermal Sludge Treatment

Sludge drying

HUBER Belt Dryer BT for sewage sludge drying up to > 90 % DS

HUBER Belt Dryer BT

- Water evaporation up to 3.3 t/h
- Low-dust high-efficiency drying
- Small exhaust air mass flow
- Utilisation of site-specific exhaust heat
- Versatile sewage sludge dryer
- Conforms to ATEX regulations
- Easy to maintain design
- Automatic operation over 24 hours per day

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

sludge2energy –
Sewage sludge utilisation

- Decentralised thermal utilisation of sewage sludge
- Energy self-sufficient concept of drying and incineration
- Long-term disposal safety and cost control
- Optional phosphorus recovery from sewage sludge ash
- State-of-the-art flue gas cleaning

Sedimentation / Secondary Clarification

Clarified Water Discharge from Secondary Clarifiers

Secondary clarifiers are in most cases the last treatment stage of the activated sludge process and therefore contribute significantly to the overall performance of a wastewater treatment plant. The efficiency of the secondary clarifier as last treatment stage is decisive for whether the quality of the wastewater treatment plant effluent meets the standards of the Waste Water Levy Act. **Secondary clarifiers should therefore remove as much as possible of the biological sludge, activated sludge or trickling filter sludge, from the wastewater**. 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.

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.

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, and sludge overflow.

All these problems can be eliminated completely with the use of a HUBER Submerged Effluent Pipe. The HUBER Submerged Effluent Pipe ensures the constant submersion height over the pipe openings of 30 cm so that the pipe remains unaffected by external influences. An outlet flow control system ensures that the submerged effluent pipe is adaptable to even strongly varying inflow situations.

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 / Deep Bed Filtration

Sand filtration

Due to increased requirements on 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. Sandfilters are a cost-effective solution to meeting effluent standards in various applications.

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 cleaned 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.

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
- 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 intermittant grit washing
- Gravity or pump feeding
- Removal of turbidities, phosphates, nutrients

CONTIFLOW® Sandfilter, concrete tank design

Benefits:

- Continuous or optionally intermittant 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

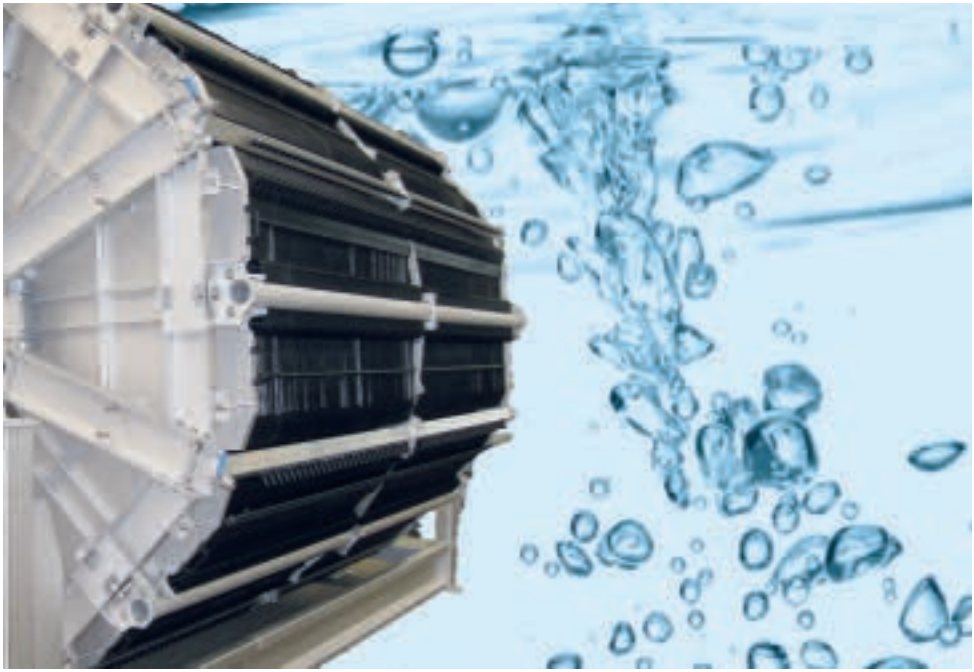
Membrane bioreactors for any throughput

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 improved 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 m³/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.

The specific scouring air flow is as low as 150 - 250 l/(m²·h) because the scouring air is supplied by air tubes to the VRM's central axis. Furthermore, the air can be blown in at only half the depth required otherwise. We achieve improved scouring of the membrane surface, with comparatively low power consumption and infrequent chemical cleaning. For decentralized applications we use our HUBER BioMem® plants that include stationary membrane plates.

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. Compared to hollow fibre membranes membrane plates have the advantage that no plaiting can occur and a 3 mm perforated screen is sufficient as wastewater pre-treatment system.

It is our philosophy to offer high-quality membrane units with long life and best value.

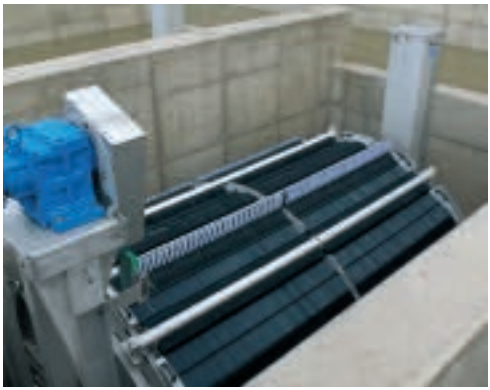
In contrast to our competitors we prefer plate membranes due to improved operational reliability, ease of maintenance and chemical cleaning, and we offer outstanding global after-sales service.

Membrane Technology / MBR / Wastewater Reuse

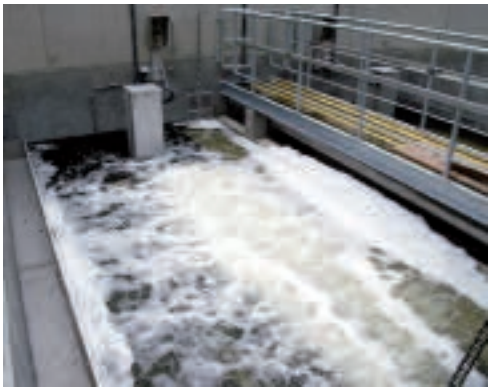
HUBER VRM® Units – for Medium to Large Bioreactors

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 on site
- Effluent reusable for irrigation of parks and gardens
- Highly resistant membranes and high-quality stainless steel
- Simple and quick detection and exchange of defective membrane modules
- No requirement for regular chemical cleaning (backwashing)
- 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



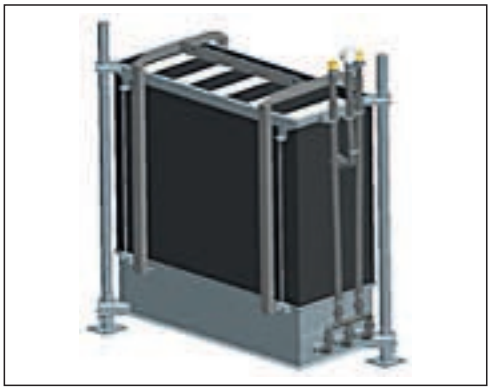
VRM® unit in operation

Membrane Technology / MBR / Wastewater Reuse

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

HUBER BioMem® system for wastewater reuse in hotels

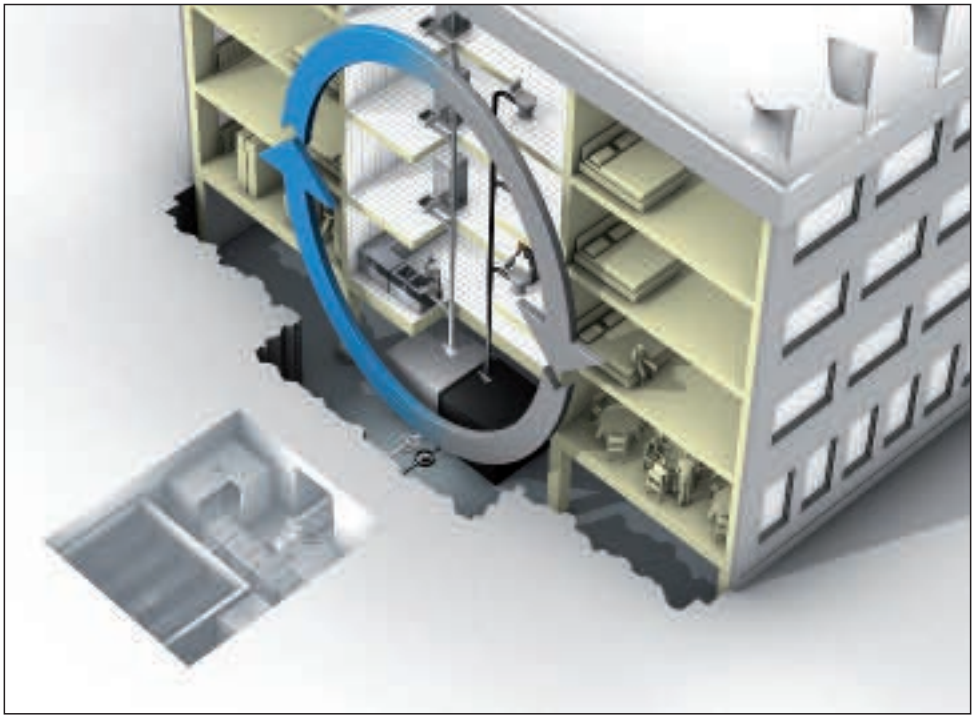
- Complete treatment of sewage of up to 2,500 PE
- Effluent reusable as service water or for irrigation
- Simple and modular design for quick and easy installation
- Mobile plants in containers available
- Redundant components for high reliability
- Single-tank system with minimum pumps and blowers and simple control strategy
- Low operation and maintenance costs
- 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 plates, insusceptible to tressing with hair and fibre
- Ultra-filtration membranes, retaining all particles, bacteria and germs



The filtration unit of a HUBER BioMem® system

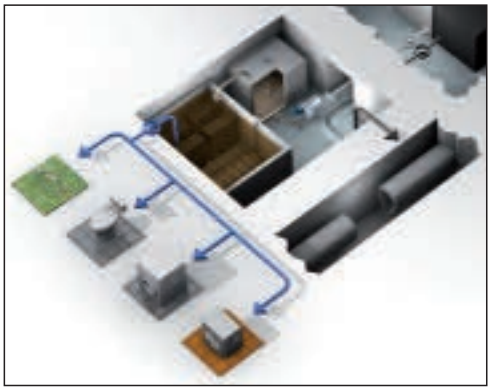
HUBER Solutions for Water Reuse and Heat Recovery

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

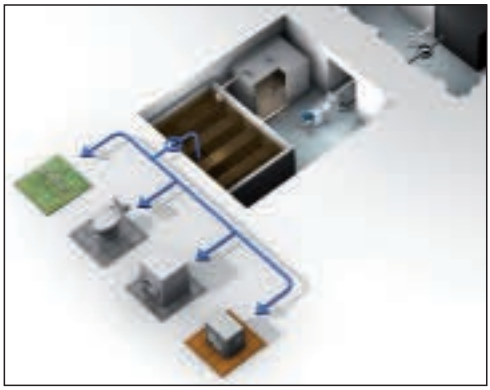
Greywater treatment: HUBER GreyUse®



Solution 1:
HUBER GreyUse® greywater treatment plant

- HUBER GeyUse® 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

Total wastewater flow treatment



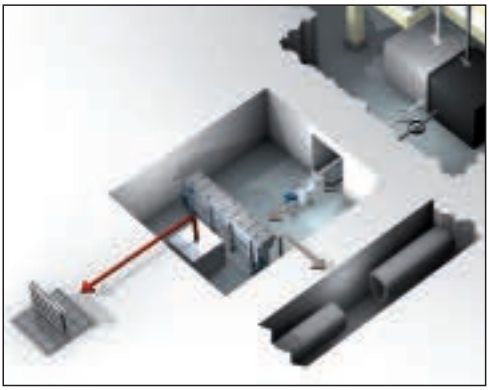
Solution 2: Total wastewater flow treatment

- 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

HUBER Solutions for Water Reuse and Heat Recovery

Heat and cold from wastewater: HUBER RoWin Heat Exchanger

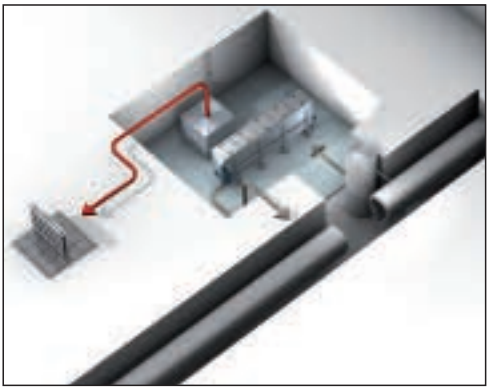
- Recovery of heat inside the house
- High system efficiency due to high wastewater temperatures
- Reduced heat losses in the building
- CO_2 reduction
- Low-maintenance process with HUBER RoWin Heat Exchanger



Solution 3: Recovery of heat and cold from wastewater: HUBER RoWin

Heat and cold from sewers: HUBER ThermWin® system

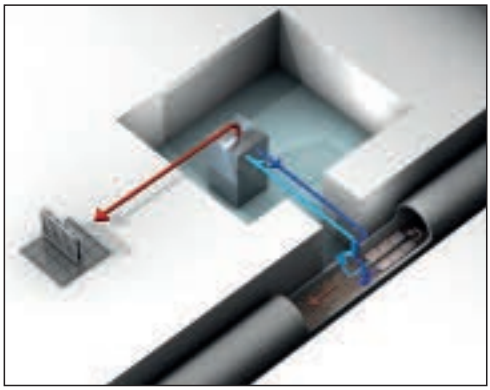
- By-pass solution, no equipment installed inside the sewer
- Suitable to be used for both heating and cooling
- CO_2 reduction
- Low-maintenance process



Solution 4: Recovery of heat and cold from sewers: HUBER ThermWin®

HUBER Solutions for Water Reuse and Heat Recovery

Heat and cold from wastewater: HUBER TubeWin Heat Exchanger



Solution 5: Heat and cold from wastewater - HUBER TubeWin Heat Exchanger

- Wastewater utilisation with a heat exchanger element installed inside the sewer
- Suitable to be used for both heating and cooling
- CO_2 reduction t
- Low-maintenance process
- Designed to be used also with low water levels
- Modular design

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 solutions of cooling and heating with 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

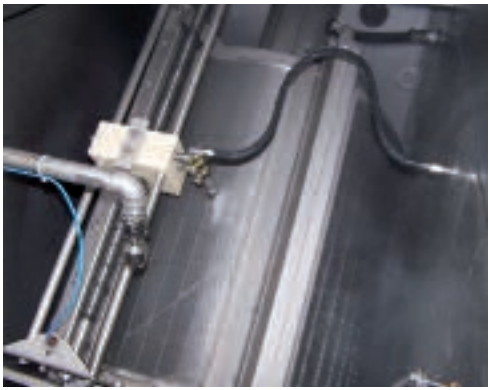
Industrial Wastewater Treatment

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:

- Unparalelled 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

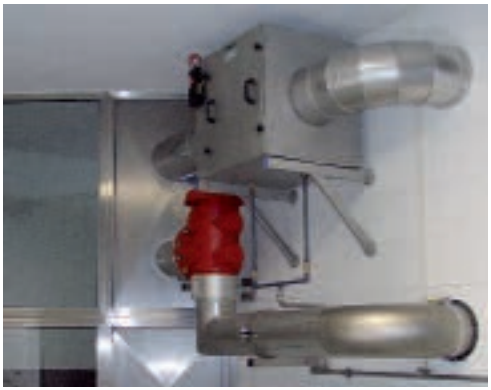
Clarifier equipment

- 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 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.

HUBER Global Service on site worldwide

Global 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 wherever in the world.

Global 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 achived in terms of operating reliability and costs.

HUBER maintenance service

Global Service

HUBER Optimisation Service

HUBER Optimisation Service

Optimally customised machines guarantee a consistantly 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 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 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.