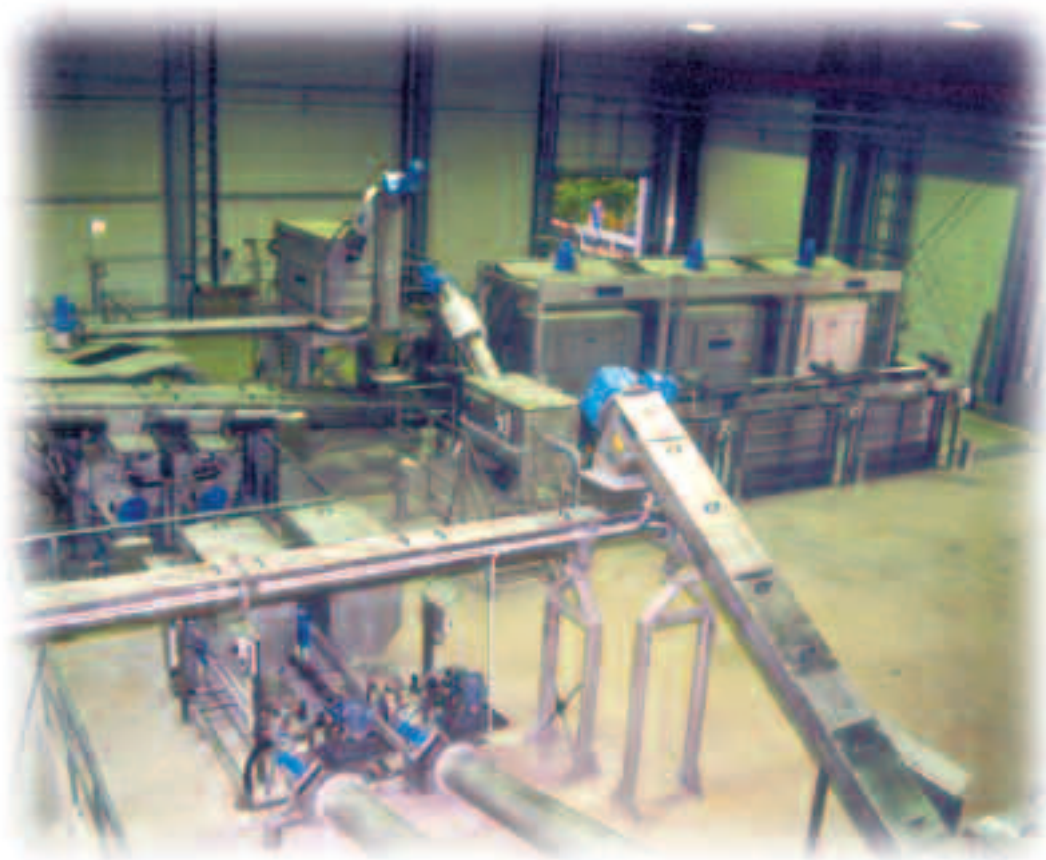


Mechanical Wastewater Screening



- Reliable screens for any application
- Fine and micro screens for separation of fine suspended material
- Innovative technology from one source



►► Screens for any application

Mechanical treatment is indispensable as the first process step of preliminary treatment for both municipal and industrial wastewater applications.

Initially coarse material has to be removed in order to protect subsequent treatment stages against damage/pollution or to relieve them. The goal is usually to completely separate floating, settling and suspended material, dependent upon the bar spacing or perforation, and remove the material from the flow into a container.

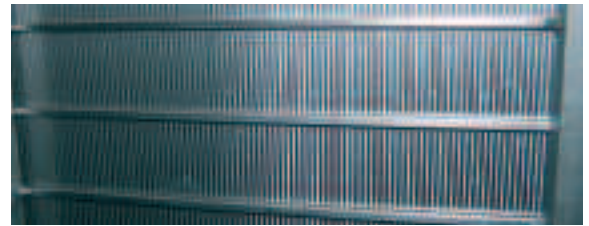
Based on the ROTAMAT® principle of screening – washing – transport – dewatering within one unit a

complete ROTAMAT® family was developed and then successfully launched within the worldwide wastewater treatment market. In recent years the STEP SCREEN® family and now the MAX® family have been added to complement the range. The HUBER screening range therefore comprises of a range of screen systems and enables us to offer the perfect solution for

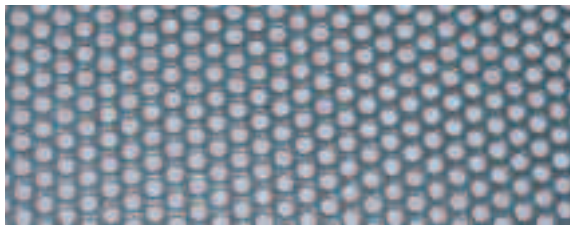
- any site specific installation conditions
- any flow rate
- any bar spacing



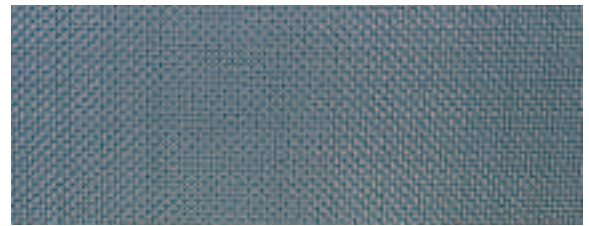
Coarse screen



Fine screen



Perforated plate screen



Mesh screen

►► The development of finer screens opens up new fields of application

The development of very fine screens for separation of finer particles opens up new fields of application in wastewater treatment.

For the recently introduced new type of membrane bioreactors within the market an improved performance is required to ensure reliable separation of hairs and fibrous material to allow the membrane process to function effectively.

A further application for these units is river and sea outfalls which frequently only have coarse mechanical screening installed but feel it will increasingly become more common and important to reduce the COD/BOD concentration of the wastewater discharged into the receiving water course. These new fine screens within a single process step can remove undegradable toilet and plastic particles along with organic material contained within the wastewater. The fine screens are preferably

equipped with a stainless steel square mesh which provides the defined separation size that enables an extensive removal of hairs and fibres to be achieved. By application of this new technology a high degree of environmental protection can therefore be achieved at a reasonable cost.

For further improvement of the screens' efficiency precipitants and coagulants can be added which have the effect that dissolved and very fine particles contained in the wastewater are converted into separable particles to enable the filterable solids to be reduced by up to 95%, COD/BOD by 65% and phosphorus by 60%.

With many regions within the world with no wastewater treatment plants, or insufficient wastewater treatment plants, fine screening can be a first and quick step in the right direction.

➤➤ Mechanical Wastewater Screening – ROTAMAT® Family

➤➤ Design and function

The operation of the ROTAMAT® family screens is based upon a unique system that allows combination of screening, washing, transport, compaction and dewatering in a single unit.

Depending on the screen bar spacing or perforation and screen size (screen basket diameter), the throughput can be individually adjusted to specific site requirements.

The ROTAMAT® screens are installed in the channel with a specific installation angle. Whilst the wastewater flows in through the open front end of the screen basket and through the screen bars or perforations, solids are retained by the screen basket, whereby the separation of floating, settling and suspended solids is dependent upon the screen bar spacing or perforation size. Blinding of the screen surface generates an additional filtering effect so that solids can be retained that are smaller than the bar spacing or perforation. The screen starts to operate when a certain upstream water level is exceeded due to screen surface blinding.

The centrally installed screw conveyor takes up the screenings and transports them upwards within the closed rising pipe.

Whilst the screenings are transported, the screw conveyor dewateres and compacts them without any odour annoyance prior to discharging them into the customer's container or a subsequent conveying unit.

➤➤ Integrated screenings washing system IRGA

The ROTAMAT® principle allows for direct integration of the screenings washing system.

As the soluble matter is separated from the inert material, faeces are virtually completely washed out which leads to a significant weight reduction.

➤➤ The user's benefits

Low headloss – High separation efficiency

Due to the screen basket design and the flat installation a large screening surface is available which results in a low headloss and high separation efficiency.

Completely made of stainless steel

The ROTAMAT® units are completely made of stainless steel and acid treated in a pickling bath.

Several functions combined in one system

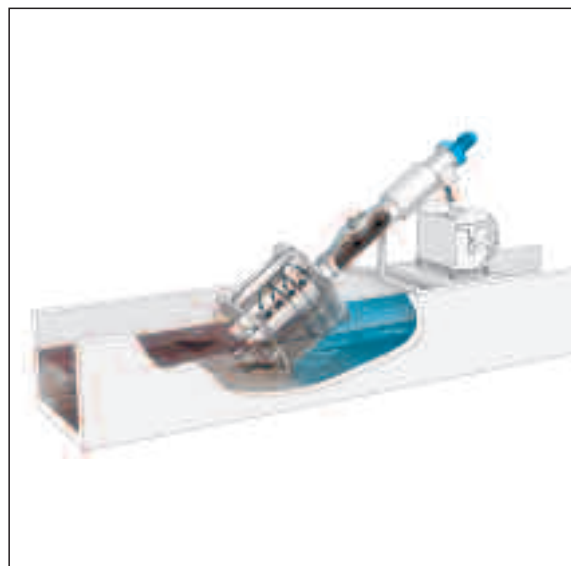
The ROTAMAT® Screens perform the functions of screenings removal, transport, washing, dewatering and compaction in a single space-saving unit. An additional bagging unit guarantees operation of the entire system without odour nuisance.

Outdoor installation

For outdoor installations, ROTAMAT® Screens can be supplied with a frost protection, combined with an additional insulation, if required.

Retrofitting

The design of the ROTAMAT® Screens allows for later modification so that the systems can be adapted to changing requirements. Both the heating and integrated screenings washing system for example can be retrofitted.



➤➤ Mechanical Wastewater Screening – **ROTAMAT® Family**

➤➤ ROTAMAT® Fine Screen Ro 1

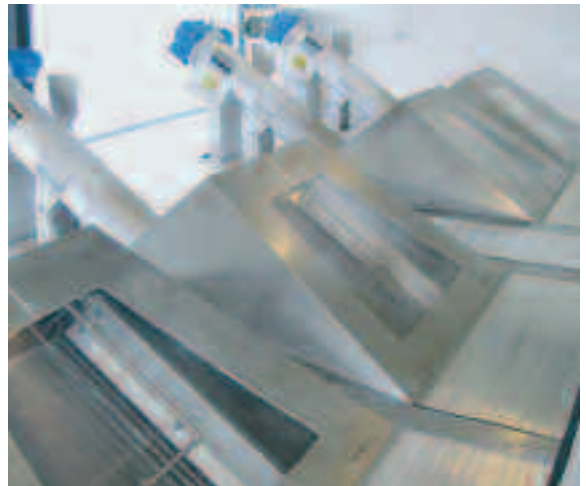
- Screenings removal, transport, washing, dewatering and compaction
- With integrated screenings press
- With integrated screenings washing system (IRGA)
- Enforced cleaning by the action of a rotating rake
- Bar spacing \geq 6 mm
- Screen sizes (basket diameter): 600 – 3000 mm



ROTAMAT® Fine Screen Ro 1 for installation in a channel or container

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

- Screenings removal, transport, washing, dewatering and compaction
- With integrated screenings press
- With integrated screenings washing system (IRGA)
- Bar spacing:
 - Wedge wire basket (0.5 - 6 mm)
 - Perforated plate basket (2 - 6 mm)
- Screen sizes (basket diameter): 600 - 3000 mm



Drum diameter up to 3 m

➤➤ ROTAMAT® Micro Strainer Ro 9

- Screenings removal, transport, washing, dewatering and compaction
- With integrated screenings press
- With integrated screenings washing system (IRGA)
- XL-version with an extended screen basket for a higher throughput, suited for narrow and deep channels
- Economy version Ro 9Ec
- Screen basket opening:
 - 0.5 - 6 mm bar spacing
 - 3 - 6 mm perforation
 - mesh basket
- Screen sizes (basket diameter): 300 - 700



ROTAMAT® Micro Strainer Ro 9 – the cost-efficient solution for small flow rates

➤➤ Mechanical Wastewater Screening – **ROTAMAT® Family**

➤➤ Screening of large volumes of wastewater **SGAM**

- Treatment of dry weather and average flow by the main screen
- Activation of the bypass screen at a predetermined high flow level
- Reduced settling processes due to optimised flow conditions
- Specifically suited for sea and river outfall applications



Combination of different screening systems for optimised treatment of large volumes of wastewater

➤➤ **ROTAMAT® Sludge Acceptance Plant Ro 3**

- Mechanical treatment of septic sludge with ROTAMAT® Fine Screen Ro 1, Rotary Drum Fine Screen Ro 2 / RPPS, or ROTAMAT® Micro Strainer Ro 9
- With integrated screenings press
- With integrated screenings washing system (IRGA)
- Optional as a complete plant Ro 3.3 with integrated grit trap



ROTAMAT® Sludge Acceptance Plant Ro 3 – a worldwide well-proven solution

➤➤ **ROTAMAT® Screw Conveyor Ro 8 / Ro 8t**

- Screw conveyors with customised design and manufacture
- Available as a closed pipe conveyor (Ro 8) or screw trough conveyor (Ro 8t)



ROTAMAT® Screw Conveyor Ro 8 / Ro 8t, applicable for any type of screenings transport

➤➤ Mechanical Wastewater Screening – **STEP SCREEN® Family**

➤➤ Design and function

The STEP SCREEN® System is widely accepted and successful due to its function and easy-to-follow operation principle as well as the simple cleaning method without any aids (self-cleaning effect according to the counter-current principle). It is furthermore easy to maintain and able to handle extremely big screenings volumes while it offers also a high operational reliability.

The motor linkage drive has been developed from the well-proven and patented link system. To the benefit of our customers we intentionally avoided difficult-to-maintain chain drives. With the new linkage type we are able to master the occurring bending moments on the lamellae, especially with high water levels.

The solids contained blind the screen surface producing a mat of screenings that has the effect of a filter the pores of which retain also smaller solids than the actual slot width would allow.

➤➤ The user's benefits

Lifting of screenings at bottom level

- due to a special bottom step design

Separation efficiency:

- High separation efficiency due to the narrow slot width and the produced screenings carpet

Cleaning:

- Self-cleaning effect due to movable lamellae

Operational stability:

- Reduced susceptibility to grit, gravel and stones due to the bottom step washing system

Protection against corrosion:

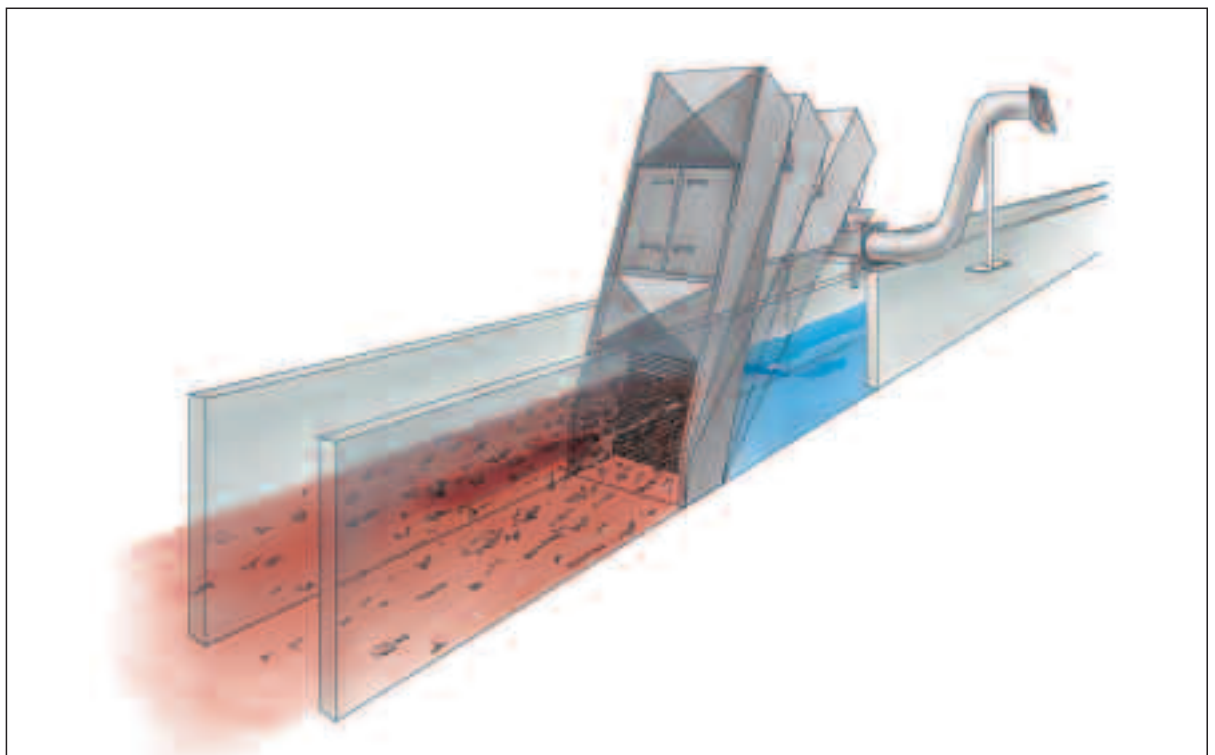
- Manufactured from stainless steel and acid treated in a pickling bath

Experience:

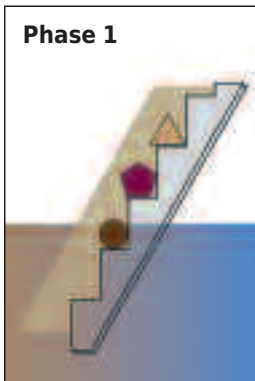
- Unrivalled for more than 20 years

Pivoting arrangement:

- Removal of the subsequent wash press or conveying unit is not required.



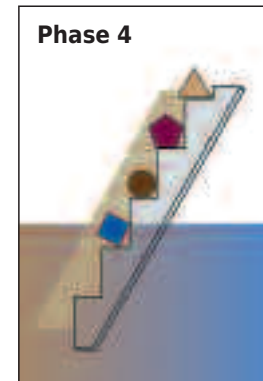
➤➤ Mechanical Wastewater Screening – **STEP SCREEN®** Family



Phase 1
The arriving screenings collect on the steps and form a carpet.



Phase 2
The complete screenings carpet is lifted and transported by rotation of the movable lamella unit.



Phase 4
The screenings carpet is laid down on the next step.

➤➤ 1. **STEP SCREEN®** installation flush with the channel floor

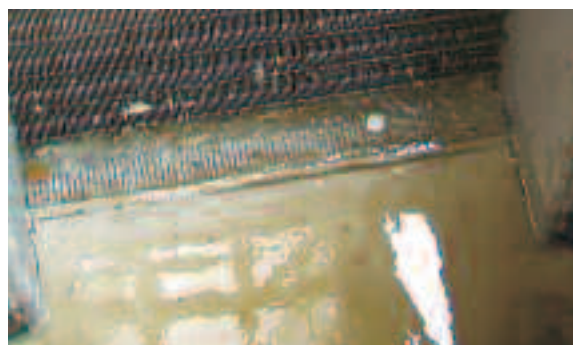
The **STEP SCREEN®** can easily be installed flush with the channel without the need to modify existing channels to suit the screen. The screen is designed for easy retrofitting into existing channels.



STEP SCREEN® installed in the customer's channel

➤➤ 2. **STEP SCREEN®** installation in channels with a step or recess

Installation of the **STEP SCREEN®** behind a channel bottom step or in a channel recess is advantageous compared to installation flush with the channel floor regarding the hydraulic capacity and removal of minerals and other heavier material. The special design of the bottom step (with a plate and spray nozzle bar) allows direct connection of the screen to the channel bottom so that the coarse material carried along the channel bottom is lifted at bottom level and removed together with the retained screenings. The optimal screen design eliminates sedimentation in front of the screen. The spray bar installed in the bottom area is operated periodically and ensures that the grit particles are carried along with the continuation flow and separated in the subsequent grit trap.



*Example of a **STEP SCREEN®** installed such that screenings are lifted at bottom level*

➤➤ Mechanical Wastewater Screening – **STEP SCREEN® Family**

➤➤ STEP SCREEN Flexible SSF

STEP SCREEN Flexible SSF		
	SSF-he (high efficiency)	SSF-hf (high flow)
Requirement:	➤ High separation efficiency	➤ High throughput
Characteristic:	➤ Continuous defined slot width	➤ Increased slot width in the bottom area

- Gentle screenings transport
- Easy-to-retrofit into existing channels without the need to modify the channel
- Lifting of screenings at bottom level with the SSF-he
- Installation angle of 40° - 53°
- Slot width: 3 / 6 mm



STEP SCREEN® Flexible SSF - the original

➤➤ STEP SCREEN® Vertical SSV

- For high discharge heights and deep channels
- Space-saving installation with an installation angle of 75°
- For high throughputs
- Lifting of screenings at bottom possible
- Slot width: 3 / 6 mm
- Discharge height of up to 6700 mm



STEP SCREEN® Vertical SSV with a steep installation angle (70°/75°) for deep channels

➤➤ Mechanical Wastewater Screening – Max® Family

➤➤ RakeMax® – Design and function

The cleaning elements, attached to the chain system, can easily be adjusted to different requirements. These elements can be conventional rakes, or brushes, or plastic wipers. As the cleaning elements are changeable, the screenings discharge capacity is then adjustable. This is especially favourable for high solids loads. The cleaning elements, consisting of the rake and comb plate, are screwed and thus independently replaceable.

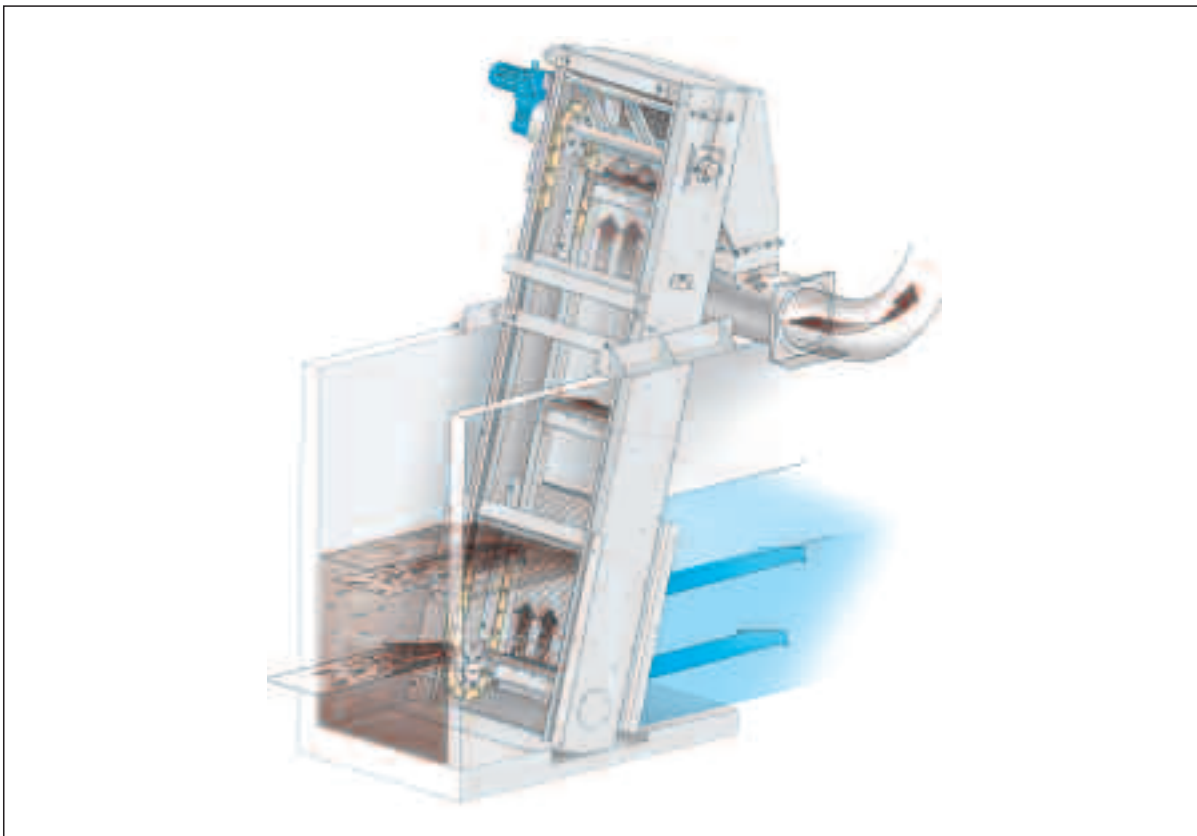
The installation height of the RakeMax® above ground level is very small and only dependent, even in case of deep channels, on the installation height of screenings transport or washing units.

Both ends of the cleaning elements are connected to drive chains. Each chain is driven by a sprocket on a common shaft and a flange mounted gear motor. Furthermore, defined meshing of the cleaning rakes with the bar rack ensures a high operating reliability. If the screen operation is blocked, a mechanical overload protection interrupts the operation.

- Very high screenings discharge capacity
- Low headloss
- Low installation height above ground level even in deep channels
- Control-independent safety system
- Bar spacing ≥ 6 mm



Reliable, sturdy travelling RakeMax® screen



➤➤ Mechanical Wastewater Screening – **Max® Family**

➤➤ ClimbMax® – Design and function

The screening element of the ClimbMax® consists of a bar rack that is cleaned when blinded by a rake that is mounted to a movable cleaner carriage.

The lateral frames with the pin gear construction are normally embedded in concrete in the lateral channel walls.

As an option, the lateral frame with the pin rack construction can be installed without any modification of the channel wall where required.

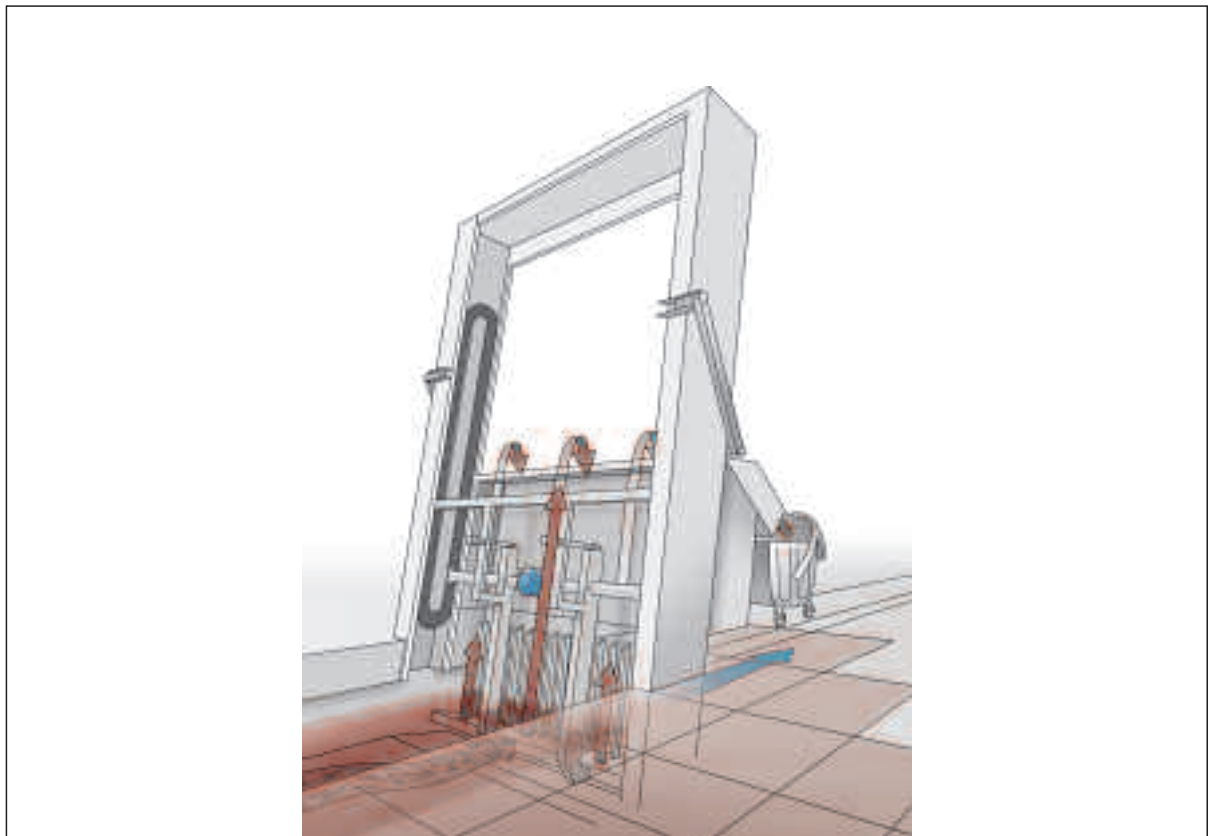
The ClimbMax® is typically used as a front cleaned screen but may under certain conditions (water level, bar spacing) also be operated as a back cleaned screen. Back cleaned installations offer the possibility of submerging the bar rack for emergency operation.

This option is particularly favourable where no emergency by-pass is available.

- Sturdy construction, operationally reliable, minimum maintenance
- Easy-to-retrofit into existing channels
- Available as front or back cleaned screen
- No submerged moving parts
- Bar spacing:
Front cleaned screen ≥ 6 mm
Back cleaned screen ≥ 15 mm



ClimbMax® Screen – a well-proven solution for large flows



➤➤ Mechanical Wastewater Screening – Max® Family

➤➤ EscaMax® – Design and function

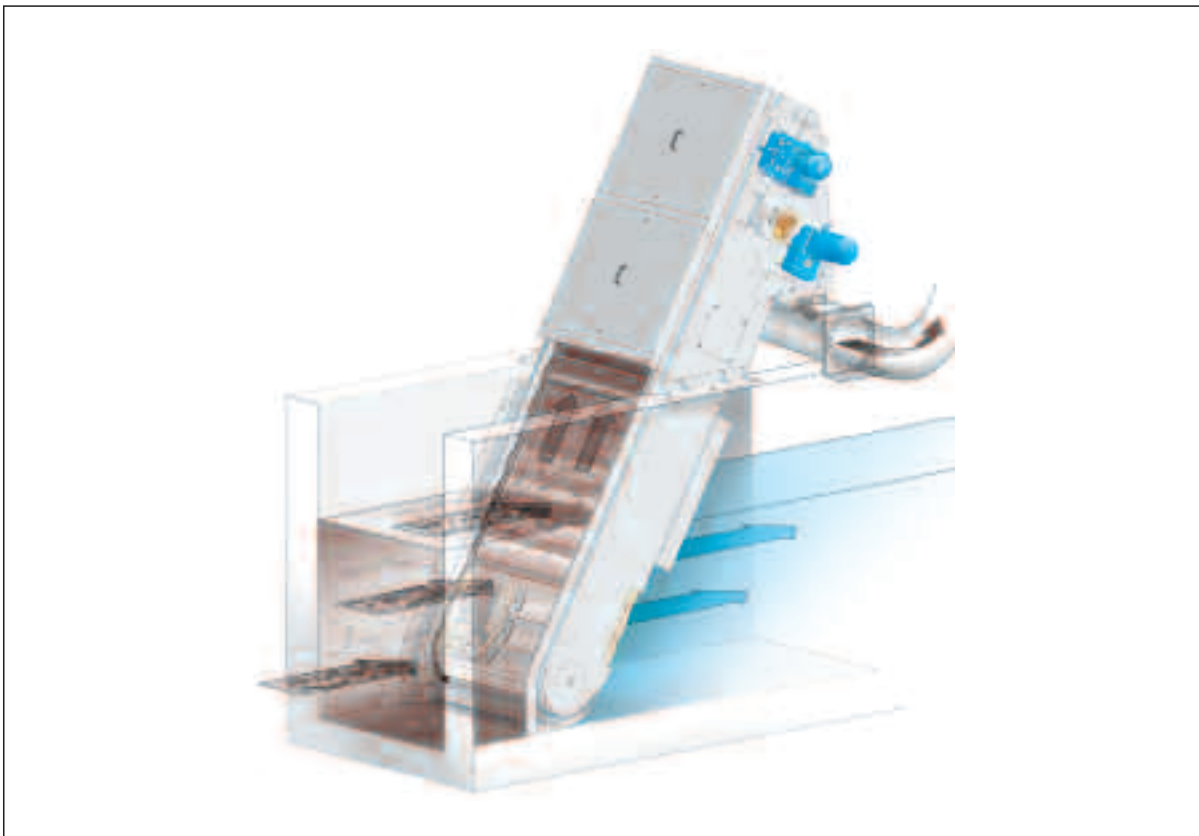
The screening elements of the EscaMax® are perforated plates. Each end of the perforated plates is connected with a drive chain, each chain is driven by a sprocket on a common shaft and a flange mounted gear motor.

At their upper turning point the perforated plates are continuously cleaned by a fast counterrotating brush which increases the cleaning energy and thus significantly improves the cleaning efficiency. Cleansing is supported by an integrated spray bar.

The sturdy EscaMax® screen is able to reliably cope with even high amounts of gravel and grit. The two-dimensional screening elements prevent especially long fibres from passing through the screen and achieve thus the maximum separation efficiency.

- Optimal efficiency due to a counterrotating brush
- Excellent separation efficiency due to its two-dimensional perforated screening elements
- Very compact system with minimum space requirements

- Easy-to-retrofit into existing channels
- Optimally suited for deep channels with high water levels
- Perforation ≥ 3 mm



➤➤ Mechanical Wastewater Screening – **Max® Family**

➤➤ CurveMax® – Design and function

The CurveMax® Screen is perfectly suited to both municipal and industrial wastewater, and process water screening. Material removal from the bar rack starts at a tangent to the channel bottom so that any accumulation of disturbing material is eliminated. The optimal approaching flow conditions and large effective bar rack surface ensure a high hydraulic throughput capacity under any operating conditions.

The curved bar rack is cleaned by a rake. Depending on the bar spacing, the bar rack design is either a bar or non-blocking wedge wire profile. At the end of the bar rack cleaning cycle the rake is cleaned by a pivoted comb discharging the removed screenings into a downstream unit. As the cleaning velocity is variable, the screenings discharge capacity is then adjustable. This is particularly beneficiary in case of increased screenings loads, e. g. due to sudden peak loads caused by emptying of upstream stormwater tanks.

The easy to access and maintain drive unit is installed above the channel. The compact frame of the CurveMax® Screen allows for a low installation height above ground level. A mechanical linkage converts the rotating course of movement of the drive motor into a curved track.

- Very low headloss due to the curved bar rack extending over the full channel width
- Easy-to-retrofit into existing channels, installation without channel recesses possible
- No accumulation of disturbing material due to material removal from the bar rack starting at a tangent to the channel bottom
- No additional consumables except electric current required for plant operation
- Directly, electrically driven mechanical linkage, no complex hydraulic unit required
- No submerged driving parts



Compact curved bar screen CurveMax® for reliable separation of solids from wastewater

➤➤ Mechanical Wastewater Screening – Fine Screening

➤➤ Square mesh screen

Separation of hairs and fibres

The removal of hairs, fibres and fine suspended material is a prerequisite for trouble and maintenance free operation of subsequent treatment steps. Separation of fibrous material is particularly important for hollow fibre membrane plants as they require very fine prior screening in order to prevent blocking by hairs and fibres which impair the membrane permeability and hydraulic capacity of the membrane plant. The conventional screening systems available with 3-10 mm bar spacing or perforation are unable to meet these requirements. Finer screens are a reliable solution to mechanically eliminate such material.

To achieve removal of high oxygen-consuming loads, screening elements with very fine apertures, preferably square mesh, are used. Their two-dimensional design combined with the defined separation size of the square mesh enables an extensive removal of solids to be achieved. In addition the very fine square mesh has a very large free surface area and is therefore able to cope with high hydraulic capacities. With the two-dimensional design, very fine apertures and the defined separation size provided by the square mesh, it will prevent in particular fibres and hairs being washed through the mesh before the screen basket surface is cleaned. The volume of screenings produced proves the high efficiency of square meshes. Compared to a wedge wire with a comparable bar spacing, a square mesh is able to separate up to 65 % more solids when handling municipal wastewater after a preceding coarse screen. In addition, square meshes have a very large free surface and are therefore able to cope with high hydraulic capacities despite their fine mesh.

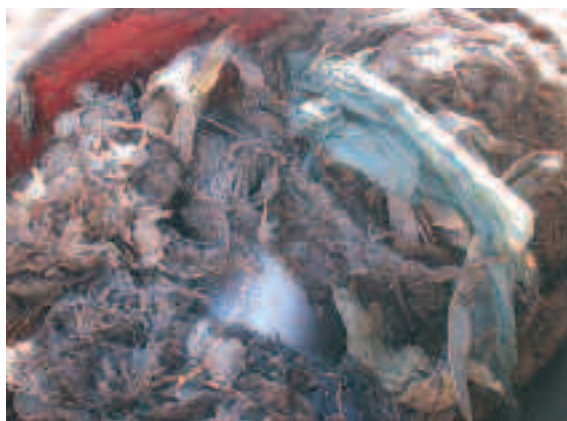
COD/BOD Reduction

Water scarcity, lack of drinking water and protection of our waters for us and our future generations is a challenge we all have to face. The cost-effective and quick to install fine screens are able to achieve a very high separation efficiency as undegradable toilet and plastic articles and organic material contained in the wastewater can be removed in a single process step. In consideration of the fact that the investment costs for a fine screen will amount to only approx. 5 % of the total investment incurring for a fully biological wastewater treatment plant (according to Western standards) and that fine screens achieve an average efficiency of up to 80 %, wastewater fine screening is considered to be a reasonable and efficient solution particularly for developing and emerging countries.

New developments in the field of mechanical wastewater treatment, combined with advanced treatment steps, such as precipitation and flocculation, allow for a further improved and even more efficient and economical wastewater treatment. By addition of flocculants, filterable solids can be reduced by up to 95%, COD/BOD by 65% and phosphorus by 60%.

River and sea outfall applications

Fine screens are particularly suited for application in river and sea outfalls which frequently have only coarse mechanical screening installed, in order to minimise the oxygen-consuming loads of the wastewater discharged into the receiving watercourse and prevent thus overloading of the watercourse due to the increasing oxygen demand. The BOD5 reduction of 20 % and filterable solids reduction of 50 % demanded by the North Sea bordering states can be achieved with the use of very fine mesh screens.



Thousands of tons of screenings within river and sea outfall applications can be removed and disposed of in an eco-friendly way by screening wastewater prior to discharge.

➤➤ Mechanical Wastewater Screening – **Finer Screens**

➤➤ ROTAMAT® Membrane Screen RoMem

- For removal of fibrous material and hairs
- Increased operational stability of membrane bioreactors
- Ideal for installation into existing channels
- Screening, (washing if required), compaction and transport of screenings in one unit
- Throughput of up to 3500 m³/h, mesh size 0.5 - 1.0 mm
- Alternative:
RoMem liquid with 'liquid' screenings discharge



ROTAMAT® Membrane Screen size 1400 with 1 mm mesh size

➤➤ ROTAMAT® Rotary Drum Screen RoMesh®

- For a fine, specified separation size
- For removal of hairs, fibres and fine suspended material
- Reduction of COD/BOD in river and sea outfall applications
- Increased performance with precipitation and flocculation
- Throughput of up to 1000 m³/h, mesh size 0.1 - 1.0 mm, perforation up to 6 mm



ROTAMAT® Rotary Drum Screen RoMesh® with 0.5 mesh size for wash water recovery

➤➤ ROTAMAT® Pipestrainer

- Fine material separator for small municipal and industrial wastewater flows of up to 5 l/s
- Designed for installation into pipe lines
- Small space requirements
- No wash water required due to mechanical screen surface cleaning
- Bar spacing from 0.2 to 1 mm, or 3.0 mm perforation



ROTAMAT® Pipestrainer with 0.5 mm wedge wire for removal of fibres

➤➤ Mechanical Wastewater Screening – Micro Screen

Municipal applications

Due to the increasing hydraulic loads and changing settling behaviour of the activated sludge, secondary clarifiers are frequently unable to reliably ensure the solids retention required. Under storm conditions for example, the amount of filterable solids can be up to three to four times the volume experienced under dry weather conditions. The increased COD, BOD and phosphorus load of the effluent will finally lead to higher wastewater fees and the loading of the receiving watercourse with oxygen-consuming substances. Frequently, further reduction of the solids load of the secondary clarifier effluent is required, in particular where the wastewater is discharged into weak receiving watercourses. The required low solids content of 5-10 mg/l can only be reliably achieved by means of a subsequent filtration unit, such as the HUBER Micro Screen.

Industrial applications

Micro screening is increasingly gaining in importance due to the growing environmental sensitivity in terms of the avoidance of waste. Preparation of wastewater from production processes, which contains suspended solids, is increasingly demanded to achieve recycling and reuse of the valuable resource water. Valuable materials should not be disposed of but micro screened so that they are available for reuse, such as for plasterboard or textile production.

➤➤ RoDisc® Micro Screen

- Disc filter for micro screening of very fine suspended material prior to discharge into the receiving watercourse
- Ideal for screening of activated sludge flocks from secondary clarification tanks and for river and sea outfall applications
- Gravity system with a large separation surface
- Reduction of COD, BOD, phosphorus, and wastewater fees
- Throughput of up to 1500 m³/h, mesh size as small as 10 µm



RoDisc® Micro Screen

➤ Installation examples



Tank-mounted ROTAMAT® Rotary Drum Fine Screen Ro 2 / RPPS



RoMem Screen with a fine mesh for removal of hairs and fibres prior to a hollow fibre membrane plant



Enclosed STEP SCREEN® SSV for odour-free screenings discharge



ROTAMAT® Sludge Acceptance Plant Ro 3.3, compact plant with grit trap and grit classifier

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Subject to technical modification

**Mechanical
Wastewater Screening**