

HUBER

Grit Separation Systems



- Reliable Complete Plants for separation of screenings and grit
- A range of grit trap systems for separation of mineral particles
- The optimally suitable system for any application

►► Why grit separation?

For the reason of operating reliability of wastewater treatment plants it is necessary to separate the grit transported with the wastewater and other mineral materials (approx. 60 l / 1000 m³ of wastewater) from the digestible organic material.

Grit separation from wastewater can prevent operational problems, such as grit sedimentation (in aeration tanks and digestors), increased wear of equipment (pumps or stirrers), blockages (hoppers or pipelines) along with wear reduction of mechanical equipment (e.g. a centrifuge, etc.). The aim for the system is to separate as much as possible of the grit and inorganic material up to 0.20 mm grain diameter whilst at the same time separate the mineral and organic particles within the grit trap.

The grit separating systems utilised today are divided into longitudinal grit traps, circular grit traps and vortex grit traps, dependent upon their design and process layout,

and each will separate the grit either by gravity (longitudinal grit traps) or centrifugal force (circular and vortex grit traps). For longitudinal grit removal scrapers or screw conveyors are frequently utilised with solids removal in the subsequent course of the process by a pump, grit classifier or integrated grit classifying screw.

Due to the significant organics content within the classified grit longitudinal grit traps they are today additionally aerated to at least partly avoid the settling of organic material within the grit trap and will cause floating material (grease) to rise to the surface. According to Kalbskopf, aerated grit traps are generally laid out on the basis of the residence time of wastewater within the grit trap. However, even aerated grit traps are unable to ensure reliable separation of grit from organics and this can only be achieved and guaranteed by well performing grit washing plants.



Typical longitudinal grit trap with suction clearer (STP Mannheim)

➤➤ ROTAMAT® Complete Plant Ro 5

Design and function

1. Fine Screening

Depending on the specific conditions and data, such as peak flow, screenings load and grit load, one of the following screens is selected:

- ROTAMAT® Fine Screen Ro 1
- ROTAMAT® Rotary Drum Fine Screen Ro 2
- ROTAMAT® Micro Strainer Ro 9
- HUBER Belt Screen EscaMax®
- HUBER STEP SCREEN® SSF

2. Screenings Treatment

ROTAMAT® Fine Screen Ro 1
ROTAMAT® Rotary Drum Fine Screen Ro 2
ROTAMAT® Micro Strainer Ro 9

Optional screenings washing is performed within the machine's rising pipe. A dewatering efficiency of up to 45 % DR is achieved with these systems.

HUBER STEP SCREEN® Flexible SSF
HUBER Belt Screen EscaMax®

Washing and dewatering of screenings from these units is performed in a separate subsequent Screenings Wash Press WAP. Depending on which type of WAP is used, a dewatering efficiency of up to 50 % DR is achieved.

3. Grit Separation

The grit trap design and dimensioning comply with DWA (former ATV) recommendations.

The plant is available as an aerated or unaerated unit. The selection of the grit trap design (aerated or unaerated) depends on several decision criteria, such as the dry weather / storm water flow ratio or specific structural conditions.

4. Grit Removal

The settled grit is collected from the bottom of the grit channel with a horizontal grit screw. An inclined grit screw conveys, agitates and dewateres the collected grit. The classified grit slides from the upper end of the inclined screw into the customer's container or a subsequent HUBER Grit Washer RoSF 4/t.

5. Grease Separation and Removal

Separation of fat and grease is an option for aerated grit channels only. Fat, oil and grease are collected in a grease trap that is connected with the parallel grit channel through slots in the separating wall. Fat and grease are driven by the rotational movement in the grit channel, induced by aeration, through the slots into the grease trap where they float to the water surface.

Contrary to many competitive products, the floating fats and oils are skimmed off the water surface with a paddle scraper that is slowly pulled with a stainless steel rope. The paddle is shaped so that it removes virtually all floating matter from the grease trap. Anaerobic degradation of fat and grease, and therewith odour nuisance, is thus prevented.

6. Optional integrated grit washing

The horizontal grit conveyor transports the separated grit fractions directly into a grit washer which is integrated at the Complete Plant outlet.

Due to a defined introduction of upwardly directed service water the grit situated within the lower part of the grit washer is fluidised within the flow enabling the lighter organic particles to be separated from the dense grit particles. The separation of the lighter organic particles from the dense grit particles is supported by a rabble rake. After removal of the organic material the clean grit is automatically removed by a classifying screw, statically dewatered and discharged into a container.



Complete Plant with integrated grit washer

The user's benefits

- Complete and compact headwork unit performing the following process steps:
 - Fine screening
 - Screenings treatment
 - Grit separation and dewatering
 - Grease separation and automatic removal
- Separation efficiency at Q_{\max} :
90 % of grit particle size 0.20 – 0.25 mm
- Completely encased unit, no odor nuisance
- Throughput capacity of up to 300 l/s
- Separate grease chamber with automatic grease removal
- Optional integrated grit washing
- More than 1,500 installations worldwide



Odour-free, clean screenings and collected grit discharge

➤➤ ROTAMAT® Complete Plant with Hydro Duct Ro 5HD

Design and function

The ROTAMAT® Complete Plant Ro 5 HD combines the benefits of both aerated and unaerated grit traps by using a high-performance grit trap with a small overall plan area. The wastewater flows firstly through an inlet screen that retains, washes, compacts and dewateres the solids contained within the flow. The screened wastewater then passes into an aerated grit trap that reduces the settlement of organics within the flow by the action of an aeration system within the grit trap. Grease along with other greasy material are collected in a separate integrated grease trap chamber from where the grease is automatically discharged by a well-proven paddle system. The flow then enters a second unaerated upflow grit trap chamber which contains an integral hydro duct that ensures a directed flow approach **from the bottom** of the chamber with positive and uniform upflow distribution. The flow velocity in the unaerated grit trap chamber is reduced to such an extent that very fine grit is easily and reliably separated. Whilst the separated particles are removed from the grit trap by classifying screws, they are simultaneously being statically dewatered prior to being discharged into a container.

The user's benefits

- Fully integrated screenings separation, washing and dewatering in one system



Maximum efficiency with the very compact ROTAMAT® Complete Plant Ro 5HD

- Very high levels of grit separation
- Separate grease chamber with automatic grease removal
- Optional integrated grit washing
- Small footprint and space-saving, compact design
- Integral emergency overflow in the grit trap

➤➤ COANDA Complete Plant Ro 5C

- Complete mechanical pre-treatment by the combination of fine screen, circular grit trap and grit classifier in one compact, encased unit
- Integrated dewatering and compaction of the screenings; option of screenings washing
- Compact, space-saving unit
- Option of frost-proof design down to -25°C
- Fully automatic control
- Completely made of stainless steel, pickled in an acid bath



The compact ROTAMAT® Complete Plant Ro 5C fits into any building.

➤➤ ROTAMAT® Mini Complete Plant MiniCop

- Very compact, space-saving unit
- Technically excellent, cost-effective solution for small flows
- Protects downstream biological treatment steps against blocking and deposition
- Easy to operate
- Option of frost-proof design down to -25°C for outdoor installations
- Fully automatic control
- High corrosion resistance



ROTAMAT® Complete Plant MiniCop – ideal for small wastewater flows

➤➤ ROTAMAT® Longitudinal Grit Trap Ro 6

- Separation efficiency at Q_{\max} :
90 % of grit particle size 0.20 – 0.25 mm
- Grit trap design according to DWA (ATV) standards
- Throughput capacity of up to 300 l/s
- Optional separate grease chamber with automatic grease removal
- Optional frost protection for outdoor installation
- Aboveground or underground installation
- High corrosion resistance
- Optional integrated grit washing



Above-ground installation of a ROTAMAT® Longitudinal Grit Trap Ro 6 with preceding screening

➤➤ ROTAMAT® Circular Grit Trap HRSF

Design and function

Separation of the grit particles in the HUBER Circular Grit Trap HRSF is supported by the rotational motion of the wastewater. The separation effect is generated by overlapping of the vertical downward motion and a developing centrifugal force acting on the individual grit particles. The inner tank surface serves as the separation area. To increase the separation area, the HUBER Circular Grit Trap HRSF has an additional separation cone for a reliable maximum separation performance. For improved separation of organics from grit, the option for air intake via an aeration system is provided. Organic components are kept floating and are discharged with the water flow above the separator cone. The separated solids are removed from the plant either directly by means of an integrated classifying screw, or pumped into a grit classifier.



HUBER HRSF Grit Traps installation

The user's benefits

- Maximum separation efficiency due to additional separation area (separator cone)
- Compact, space-saving unit
- With integrated grit classifying screw (optional)
- Optional concrete tank design
- Optional with scum separator and aeration

➤➤ HUBER Vortex Grit Chamber VORMAX

Design and function

The screened wastewater enters the VORMAX at the bottom of the grit chamber where a tangential rotational movement is generated due to the curved vortex chamber. A constantly running stirrer supports wastewater circulation in the grit chamber and ensures a constant velocity of rotation in the whole grit trap system. Additionally, a baffle plate installed radially around the stirrer induces an axial flow towards the centre of the grit chamber. Due to the constant radial rotation and axial flow the solids are very quickly collected in the centre of the grit chamber from where they pass into the below grit collection tank. The grit-free wastewater flows then over a weir to the next treatment step. The collected solids are pumped from the grit collection tank into grit washers.

The user's benefits

- Compact, space-saving unit
- High grit separation efficiency



HUBER VORMAX installation prior to start-up

- Low energy demand
- Throughput capacity of up to 3000 l/s
- Low pressure loss
- Optional with subsequent grit washing

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