

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
- High hydraulic throughputs

►► 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, DWA Work Sheet M369) 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)

➤ HUBER Complete Plant ROTAMAT® Ro5

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:

- HUBER Fine Screen ROTAMAT® Ro1
- HUBER Rotary Drum Fine Screen ROTAMAT® Ro2
- HUBER Micro Strainer ROTAMAT® Ro9
- HUBER Belt Screen EscaMax®
- HUBER Fine Screen STEP SCREEN® SSF

2. Screenings Treatment

HUBER Fine Screen ROTAMAT® Ro1
HUBER Rotary Drum Fine Screen ROTAMAT® Ro2
HUBER Micro Strainer ROTAMAT® Ro9

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 Fine Screen STEP SCREEN® SSF
HUBER Belt Screen EscaMax®

Washing and dewatering of screenings from these units is performed in a separate subsequent HUBER 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 RoSF4 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 (option)
- Optional integrated grit washing
- More than 2,000 installations worldwide



Odour-free, clean screenings and collected grit discharge

➤➤ HUBER Complete Plant Hydro Duct ROTAMAT® Ro5 HD

Design and function

The unique HUBER Complete Plant ROTAMAT® Ro 5HD combines the benefits of both aerated and unaerated grit traps by using a high-performance, innovative 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 the grit trap tank where it generates a spiral flow. Integrated air tubes support the spiral flow and ensure that the organic particles are kept in suspension. Additionally, grease and similar substances float to the surface by the action of the aeration system within the grit trap. 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 settles at the bottom and the grease rises to the water surface from where it is automatically removed by a well-proven paddle system. Whilst the particles separated from both chambers are removed from the grit trap by classifying screws, they are simultaneously being statically dewatered prior to being discharged into a container.



Maximum efficiency with the very compact HUBER Complete Plant Hydro Duct ROTAMAT® Ro5 HD

The user's benefits

- Fully integrated screenings separation, washing and dewatering in one system
- Very high levels of grit separation of 95% of grain size 0.20 - 0.25 mm
- Large grease separator with automatic grease removal system
- Throughput capacity up to 150 l/s
- Small footprint and space-saving, compact design
- Integral emergency overflow in the grit trap
- Optional integrated grit washing

➤➤ HUBER Coanda Complete Plant Ro5 C

- 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
- Throughput capacity up to 25 l/s
- Compact, space-saving unit
- Option of frost-proof design down to -25°C
- Fully automatic control



The compact HUBER Coanda Complete Plant ROTAMAT® Ro5 C fits into any building.

➤➤ HUBER 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
- Throughput capacity up to 5 l/s
- Easy to operate
- Option of frost-proof design down to -25°C for outdoor installations
- Fully automatic control



HUBER Mini Complete Plant MiniCop – ideal for small wastewater flows

➤➤ HUBER Longitudinal Grit Trap ROTAMAT® Ro6

- 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
- Completely encased unit, no odour nuisance
- Optional integrated grit washing



Above-ground installation of a HUBER Longitudinal Grit Trap ROTAMAT® Ro6 with preceding screening

➤➤ HUBER 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 Circular Grit Trap HRSF 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

Grit separation with the HUBER Vortex Grit Chamber VORMAX starts already in the inlet channel to the grit trap. Like in an un-aerated longitudinal grit trap the grit sinks down to the channel bottom from where it is transported into the circular grit trap along with the wastewater flow. A tangential rotational movement is generated due to the curved design of the (mostly concreted customer's) concrete tank. A constantly rotating stirrer helps support the wastewater circulation within the grit chamber ensuring a constant velocity of rotation within the complete grit trap system even with greatly varying hydraulic conditions. Due to the constant radial rotation, caused by a secondary flow near to the bottom, the solids are very quickly collected within the centre of the grit chamber from where they then pass into the bottom of the grit collection tank. The grit-free wastewater then exits and flows over a weir onto the next treatment step. The collected solids are pumped from the grit collection tank into grit washers.



HUBER Vortex Grit Chamber VORMAX

The user's benefits

- Compact, space-saving unit
- High grit separation efficiency
- Low energy demand
- Throughput capacity of up to 3000 l/s
- Low pressure loss
- Optional with subsequent grit washing

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