COANDA Grit Washer RoSF 4

Grit separation, washing, dewatering in one system

- Reduced disposal costs
- Utilisation of the Coanda effect ensures high grit removal efficiency.
- Less than 3 % organic content
- High solids throughput
- More than 1300 installations worldwide

The situation

Grit from grit traps of wastewater treatment plants

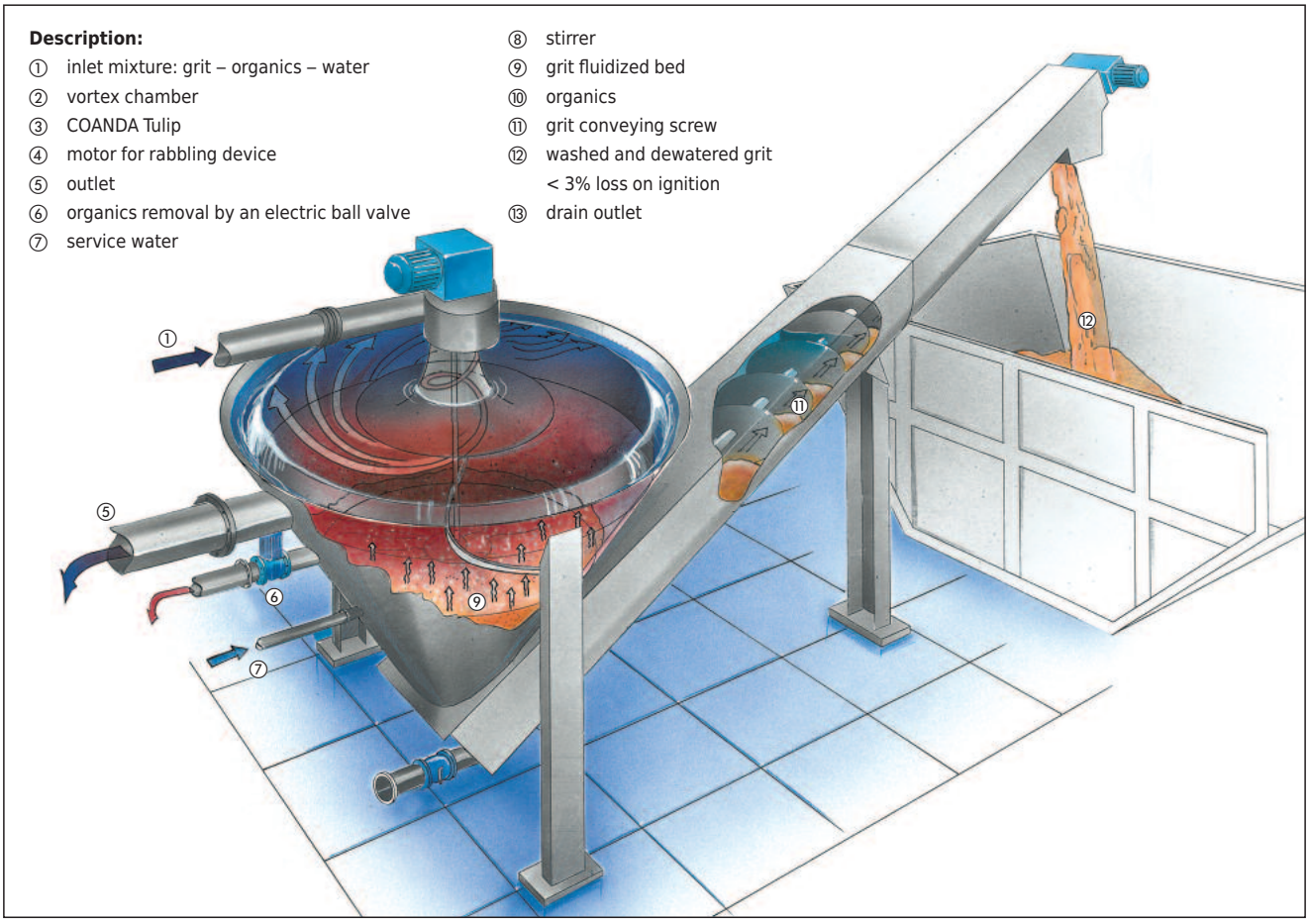
The grit contained in the wastewater is usually removed in grit traps by gravity or centrifugal force to protect downstream equipment. Various different grit trap systems are available for this purpose which however separate not only the grit but frequently also many of the organic particles, dependent upon the hydraulic load (inflow). The separated particles are then pumped from the grit trap to a grit classifying unit (screw or pilgrim step classifier) which remove the solids from the flow without any differentiation. As a result, the loss on ignition of the classified grit trap material varies from 10 % to 80 % depending on the screen bar spacing and inflow. The water content of the grit trap material is accordingly high (50 - 80 %).

The result are inevitably high costs for removal, transport and disposal, and in addition very bad hygienic conditions.

Grit from sewer systems, gully waste, road refuse

These raw materials are more or less contaminated with organics (sludge, leaves, etc.), but they contain also foreign matter that is similar to domestic waste (such as cans, screenings, stones, etc.), and a considerable amount of water. Additionally, the individual raw materials (grit, organics, foreign matter) vary seasonally so that their loss on ignition will range from 5 % to 80 % and their water content from 40 % to 90 %.

This results in inevitably high costs for dewatering, removal, transport and disposal.



Flow diagram of a COANDA Grit Washer RoSF 4

Design and function

Classifying and washing in one system

The COANDA Grit Washer combines grit classifying and grit washing in a single and compact unit. By using the COANDA effect the process of classifying can be combined with the process of sorting to ensure a continuously high separation efficiency and outstanding washing performance.

COANDA effect for excellent grit classifying

A mixture of grit, organics and water is fed through a vortex chamber where a fast spinning rotational movement is generated. The mixture then flows down through a trumpet-shaped COANDA Tulip.

The flow is diverted along the curved inner surface of the COANDA Tulip by the COANDA effect that a liquid flow is adhering to the contour of a curved surface. The flow is thus smoothly, without generation of eddies, diverted from a fast rotating vertical direction to a gradually slower rotating horizontal direction. The diagram shows the high flow velocity (red vectors) along the inner surface of the COANDA Tulip, the moderate radial velocity (green vectors) underneath the water surface and the again high velocity at the weir. The solids contained in the flow (grit particles, organic material) are then separated due to the flow diversion combined with flow velocity reduction, dependent upon the particle settling velocity, and sink down to the bottom portion of the tank. The excellent flow pattern in the COANDA Grit Washer leads to a > 95 % separation of 0.20 – 0.25 mm diameter grit particles.

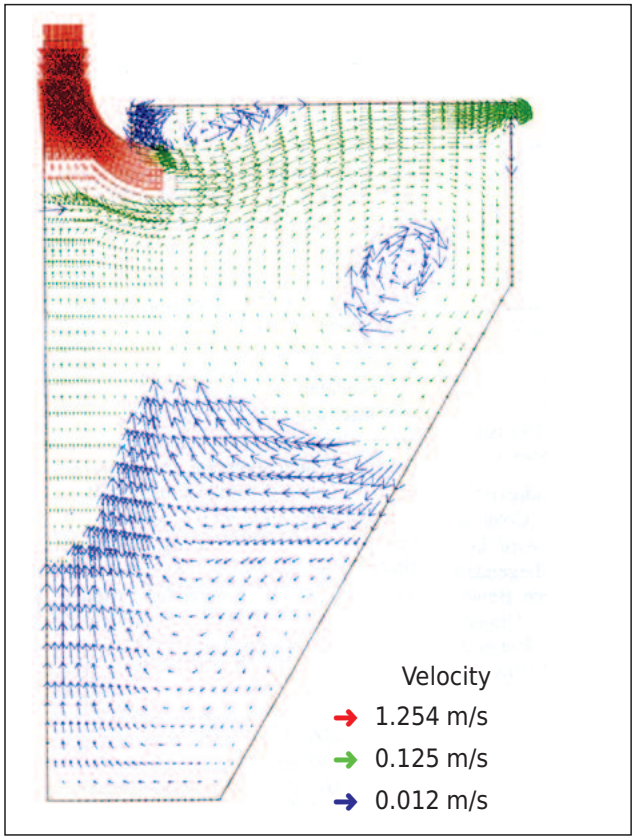
The separation degree depends on the settling velocity of the solids to be separated (due to the influence of particle density and size) so that also organic material will be separated.

Fluidised bed for outstanding grit washing

The separated grit is then washed, i.e. attached organic matter is separated from the mineral grit particles. This takes place in the bottom portion of the COANDA Grit Washer where a fluidised grit bed is generated. Wash water is fed into a bottom chamber that is separated from the grit washer tank by a perforated plate and a perforated rubber diaphragm. The wash water flows upwards through the diaphragm and is evenly distributed over the bottom of the tank thus generating a fluidised grit bed. Within the fluidised bed the grit particles rub against each other thus removing organics from their surfaces. This process is supported by the central stirrer keeping the particles in motion.

After removal of the organic material the clean grit is removed through a classifying screw, statically dewatered and discharged into a container.

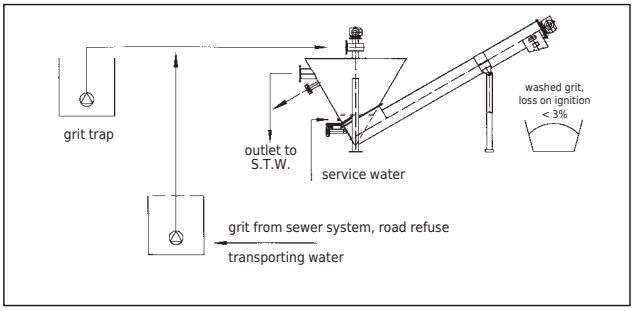
The organic material left in the COANDA Grit Washer is removed from the plant also automatically but discontinuously, depending on the entire process, so that a defined separation capacity is constantly available.



Flow velocities in the COANDA Grit Washer RoSF 4 (measured by TU Munich)

Washed grit removed at a wastewater treatment plant

Options for grit washing processes



- Reduced disposal costs
- 95% capture rate of 0.20 – 0.25 mm diameter grit particles due to the COANDA Effect and low surface overflow rate
- Organic content reduction to < 3% loss on ignition
- Dewatering of washed grit to approx. 90% dry residue

The user's benefits

- No additional preceding screening required (e.g. < 4 mm)
- High grit and gravel yield
- Suitable for treatment of grit from sewers, gully waste, road sweepings
- No crushing of stones and gravel inside the plant
- The screw is supported on both ends for minimised wear.
- Optional grit removal even during grit feeding due to on-line grit level measurement
- Encapsulated, odour-free plant
- Separate organics discharge allows for separate further treatment of organics
- Large diameter screws for a high solids throughput
- Stainless steel stirrer and screw
- More than 1300 installations worldwide give proof of customer satisfaction
- Easy to integrate into complete treatment processes

Installation examples

Innovative technology: COANDA Grit Washer RoSF 4 size III with frost protection for outdoor installation

Reduced disposal costs and improved hygienic conditions with the COANDA Grit Washer

HYDROFLUX epco

Level 26, 44 Market Street, Sydney, NSW 2000
www.hydrofluxepco.com.au
e: info@hydrofluxepco.com.au