

HUBER Report

International

News for Customers and Friends of HUBER TECHNOLOGY

May 2012

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IN BRIEF

Sludge Treatment

Due to the great response we receive from the market to our RoS 3Q Screw Press units we have developed a new RoS 3Q model with a higher throughput capacity. The new RoS 3Q size has a 620 mm dia. screen basket to allow for a sludge throughput up to 15 m³/h. With our Ros 3Q 620 we aim at the target group of wastewater treatment plants designed for up to 50,000 PE.

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Utilisation of wastewater as a thermal heat source

New modern buildings prevent the loss of heat to a great extent but enormous amounts of energy are still lost through wastewater pipelines. A special heat exchanger is required to recover this energy. We have therefore added the HUBER TubeWin Heat Exchanger to our product portfolio.

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Filtration & ReUse

The HUBER BioMem[®] filtration unit is an addition to our portfolio of MBR solutions. This smaller counterpart of the HUBER VRM[®] Bioreactor has been designed for smaller throughputs and is therefore ideal for decentralised applications (housing development areas, hotels, small industrial companies, etc.).

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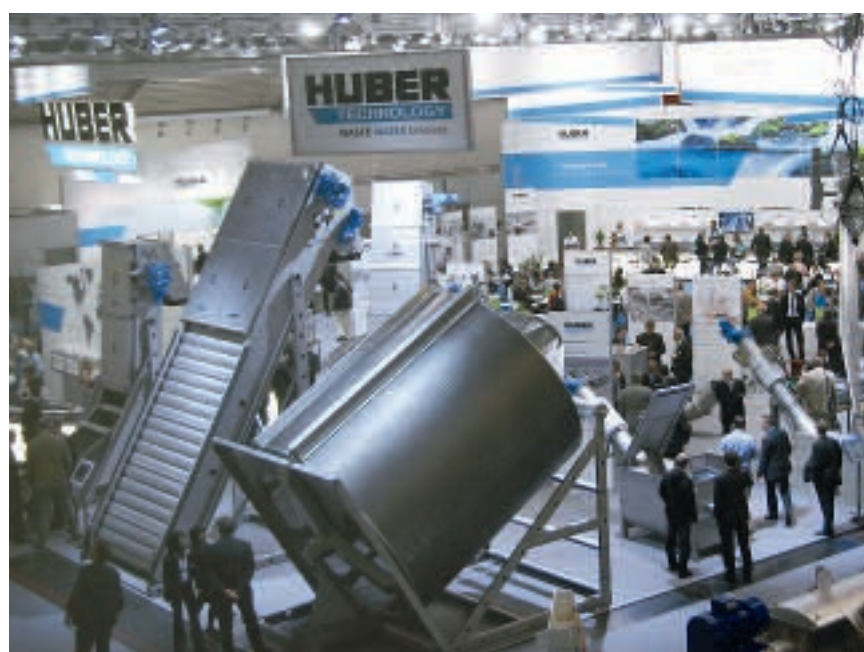
Industry

Exploding city populations are demanding new ideas for water recycling solutions. HUBER have responded to this growing demand with the launch of the 'smartMBR' range of wastewater treatment & recycling systems.

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Major international trade fair for water, wastewater, refuse, recycling

HUBER exhibits at IFAT ENTSORGA 2012



The HUBER stand at IFAT ENTSORGA 2010

IFAT ENTSORGA is the most important international trade fair for innovations and services for water, wastewater, refuse, and recycling. More than 2,700 exhibitors will show their products and innovations for sustainable water management in industrial nations and adapted technologies for developing and emerging countries. Conferences, symposia, workshops

and forums will be organised to complete the program. Every two years Munich is the centre and pivotal point of international environmental technology.

From 7 to 11 May 2012 everything in the city will be about environment again. HUBER has exhibited at IFAT for many years and always presented one of the biggest stands. This year, HUBER will show its product portfolio on an area of more than 1,100 m². With its worldwide reputation, the trade fair is of great importance also for HUBER.

HUBER is opening new markets in the fields of "Green Building" and "heat from wastewater". IFAT is the optimal platform to present further developments and novelties. For easy orientation on our stand (no. 333, hall A2) without spending too much time on finding exhibits or your contact partners, you will find a site plan on page 8 and 9.

Bavarian State Minister Marcel Huber speaks at official opening

Official opening of sludge2energy project at Straubing



The guests of honour symbolically pushed the start button.

The sludge2energy plant for the recovery of energy from sewage sludge, the first pilot project of its kind nation-wide, was officially inaugurated on 27.01.12. After mayor Markus Pannermayr and Dr.-Ing. E.h. Hans Huber had held their welcome speeches, Bavarian State Minister for the environment and health Dr. Marcel Huber spoke to the invited guests. Dipl.-Ing. Cristina Pop, head of the city's civil engineering office, expressed her appreciation to economy and science before dean Erhard Schmidt and deacon Dieter Rein gave their blessing to

the new plant. The guests of honour symbolically pushed the start button for a project that is a role model for the world.

"Sewage sludge is nothing that should be spread on land, this is also the position of the Bavarian State government", said Dr. Marcel Huber and appreciated the HUBER showcase project. Previously, almost all the sludge generated on WWTP Straubing had been disposed to agricultural land as common in many places before the groundbreaking ceremony for the sludge2energy project took

place in 2008. To cut a long story short, the modern HUBER plant produces heat and energy from sewage sludge. The plant dries and incinerates all the sludge generated on the WWTP. The energy set free during this drying and incineration process is available to be used to operate the wastewater treatment plant.

HUBER is therefore right to promote this decentralised solution for energy self-sufficient sewage sludge utilisation. Also mayor Markus Pannermayr is fully convinced of the benefits the plant offers; it produces about 1,400 tons of phosphorus-containing ash per year from 10,000 tons of dewatered sludge. The phosphorus content of the ash is even high enough to think about a phosphorus recovery solution.

The plant consists of a HUBER belt dryer, a grate stoker furnace and micro gas turbine. Presently, it is successfully operated by HUBER itself. Probably at the end of 2013, when the economic efficiency of the s2e solution has been proven, the municipality of Straubing will take over the plant. The municipality will then become independent of the sludge disposal market and profit from long-term cost certainty.

EDITORIAL



Dear Reader,

National and international experts and thousands of visitors from all over the world will come to Munich again in May to visit IFAT ENTSORGA, the most important international trade fair for water, wastewater, reuse, and recycling, where they can see and discuss new products and solutions to be applied and implemented in the coming years. It will certainly be exciting again to see which new technologies and trends show up or have established themselves. Two subjects, which have also been the focus of our business in the past years, will definitely be the centre of attention: closed water loops, through utilisation of heat energy or decentralised wastewater treatment for example, and improved integration of mechanical systems and communication technology for maintenance and control. Because practice is always better than theory alone we offer an excursion to WWTP Straubing where you can experience live our innovative ThermWin system which utilises wastewater heat and our sludge2energy system for thermal sludge utilisation. On more than 1,100 m² stand area (hall A2, stand no. 333) we will show you innovative products and solutions of the high quality for which HUBER is known. We finally want to stay your reliable partner for a long time to come and provide future service and maintenance for what we sell today. Comprehensive information is available in advance on our IFAT internet page ifat.huber.de. Additionally, we would like to use this HUBER Report issue to give you a taste of what you can expect from us at IFAT 2012 and in the years to come. I look forward to seeing you at our IFAT stand in May and will be pleased to hear your comments and suggestions for improvement. We want to do our best to ensure you can rely on HUBER as your partner also in the future.

Very sincerely yours,

Georg Huber

Continued from page 1: [New RoS 3Q Screw Press size: successful continuous operation test](#)

News Screw Press size for high throughputs



integrated in the local system so that it can be operated 24 hours. After intensive briefing of the local operating staff they have operated the screw press on their own.

The results of the 8-week operation period:

The screw press has been operated both during the day and, without any operator attention, during the night. After optimisation of the press operation by the local staff the unit achieves the following results:

The continuously operating screw press needs a specific polymer dose of 14 to 15 kg/tDR to achieve dewatering degrees of 27 to 29 % with a throughput of 9.5 m³/h and a solids

	RoS 3Q 620	Centrifuge
Rotary speed of compacting screws / drum [rpm]	0.2 – 1.0	2500 - 3000
Throughput capacity [m ³ /h]	5 - 14	8
Solids load [kgDR/h]	220 - 320	360
Dewatering result [% DR]	23 - 29	23 – 25
Specific polymer consumption [kg/tDR]	10 - 15	15
Installed capacity*) [kW]	2.2	approx. 20
Specific input power*) [kW/tDR]	4	approx. 40
Specific output related to solids load [kWh/kgDR]	0.007 - 0.01	0055

*) dewatering unit only

load of 260 kg/h. Operation with the same throughput but a significantly reduced polymer dose of 10 to 11 kg/tDR has resulted in a dewatering degree of 23 to 25 %.

The performance data of a mobile centrifuge unit are listed additionally for comparison. This centrifuge was tested for several weeks just before our RoS 3Q screw press.

The test results of the RoS 3Q 620 are a complete success:

- Problem-free continuous operation managed by the local operating staff on their own
- Significantly better dewatering results than a centrifuge with comparable polymer doses

➤ Comparable dewatering results with a significantly lower polymer demand of the RoS 3Q screw press

➤ The energy demand of the RoS 3Q screw press is by a factor of 10 lower

In addition to the above performance data the new screw press excels with virtually noiseless operation and minimum wear – the same qualities for which our well-proven basic RoS 3Q models have been known for years. The very simple maintenance concept of the RoS 3Q 620 shows that the focus of our development work has not been limited to just increasing throughput capacity.

The new machine has been tested on a real wastewater treatment plant to prove its qualities under continuous operation conditions:

- Problem-free continuous operation even at the capacity limits
- Competitive dewatering efficiency
- Minimum energy consumption
- Easy to operate

The mobile RoS 3Q unit is continuously operated on a 70,000 PE wastewater treatment plant where the unit dewateres digested sludge with an organics content of approximately 65 %. The mobile screw press is fully



Continuously operated RoS 3Q 620 unit

[Drying the sewage sludge of more than 120,000 PE](#)

Two-stage HUBER Belt Dryer on WWTP Balingen – first operating results



The wastewater of more than 120,000 people is treated on WWTP Balingen, Baden-Württemberg, Germany. The generated dewatered sludge, along with other sludges from that region, is dried in an innovative HUBER Belt Dryer.

The heat required for the drying process is provided by the thermal post-combustion unit of a sewage sludge gasification plant and a block heat and power plant operated with digester gas, with the result of two different temperature levels. It is defined as primary goal to most efficiently use these two heat sources in the drying plant. The HUBER BTplus 2-2 dry-

er installed at Balingen is therefore the first HUBER Belt Dryer with two different temperature levels and additionally insulated head pieces.

The dryer is divided into two temperature zones to ensure the higher drying velocity at high temperatures is adequately used. The low temperature zone is supplied with the approximately 90 °C flow from the block heat and power plant, while hot water from a synthesis gas burner of the sewage sludge gasification plant is utilised in the high-temperature zone. Thus, most of the energy required for drying can be generated from dried sewage sludge.

The rest of the heat required to cover the total energy demand is provided by a boiler which can be operated with the biogas from the digester or with natural gas. A part of the energy (up to 260 kW!) is extracted downstream of the dryer and returned to the WWTP's heating system so that virtually the complete exhaust heat from the WWTP is utilised with a minimum input of primary energy.

After start-up of the gasification plant in spring 2011 the belt dryer successfully passed the performance test. The plant was officially put into operation in September 2011, which was celebrated with an Open Day. The HUBER Belt Dryer has proven its efficiency right from the beginning. Even difficult to treat sludges from five different external sewage treatment plants have been no problem, neither for the dryer nor for the pelletising system developed by HUBER.

No wonder Dipl. Ing. Joachim Hölle of the engineering office Dr. Götzelmann+Partner (Stuttgart-Balingen) and Siegfried Sauter, manager of WWTP Balingen, have only good things to say. They are fully satisfied with the dryer performance although they had some doubts initially if the HUBER feeding and pelletising system would be able to handle the external sludges. Now they are especially happy that the results the dryer achieves even exceed the guaranteed performance results. Furthermore, they have never experienced any dust or odour problems.

We would like to use this opportunity to thank the engineering office Dr. Götzelmann+Partner and the Balingen association for sewage treatment for their perfect cooperation in the complete project. The vision of the Balingen association for sewage treatment is an energy self-sufficient wastewater treatment plant. We are proud to contribute our share with HUBER products.



Belt dryer on WWTP Balingen with two temperature zones for efficient sewage sludge drying



Aerial photo of WWTP Balingen, source: ZV Abwasserreinigung Balingen

Input	Dewatered sewage sludge with approx. 28 % DR	approx. 5,700 Mg/a
Output	Dried sludge with approx. 85 % DR	approx. 1,885 Mg/a
Capacity	Dewatered sludge throughput (28 % DR)	approx. 880 kg/h
Water evaporation	Water evaporation (28→85 % DR, 6,500 h/a)	> 3.815 MgH ₂ O/a
Thermal energy demand	Specific heat demand (28→85 % DR)	< 830 kWh/MgH ₂ O
Electric energy demand	Specific power demand incl. all ancillary units	< 100 kWh/MgH ₂ O

Technical data of the HUBER Belt Dryer on WWTP Balingen

Targeted marketing of sewage sludge utilisation plants

HUBER and WTE plan to found new sludge2energy GmbH



The sludge2energy system has been well known among experts for several years already as an innovative HUBER solution for decentralised sewage sludge utilisation. Our initial idea to utilise the waste material sewage sludge as a resource has become reality: The sludge2energy plant in Straubing has operated successfully since its installation.

The demand for thermal sewage sludge utilisation is rising worldwide because landfilling and agricultural use of sewage sludge is not allowed any more or will soon be prohibited in more and more countries. The slud-

ge2energy system is a cost-effective and sustainable solution which provides security of sewage sludge utilisation.

- Sewage sludge is utilised in a decentralised system on site.
- The energy contained within sewage sludge can be used for energy self-sufficient plant operation.
- The ash from mono-incineration of sewage sludge is rich in phosphorus and therefore a good source for phosphorus recovery.

In cooperation with WTE in Essen HUBER have used their experience to develop the sludge2energy system as a turnkey solution for sewage sludge utilisation.

The comprehensive expertise of both companies in the fields of sludge treatment, sewage sludge drying, incineration, and manufacture and operation of plants has been used to develop a cost-effective and reliable modular system which meets specific customer requirements.

The planned joint enterprise sludge2energy GmbH will be based in Berching. It will develop and implement customised solutions for sewage



The logo of the new company: S2E as abbreviation for sludge2energy



The two managing directors of the new sludge2energy GmbH: Jörg Köring (left) and Harald Plank (right)

sludge utilisation and offer them on the global market.

The sludge2energy GmbH provides engineering support, manufacture and operation of turnkey products and financing of sewage sludge utilisation plants. The managing directors of the new sludge2energy

GmbH are Mr. Jörg Köring (WTW) and Mr. Harald Plank (HUBER SE).

Both have gathered broad experience over many years in their mother companies and will for the first time represent their new company at the IFAT 2012 (hall A2, stand no. 333, and hall B1, stand no. 155).

Solar dryers are in demand worldwide even for big and medium-sized wastewater treatment plants

Sludge drying with solar power



Solar drying of sewage sludge is a technique that is increasingly used by operators of medium-sized and large wastewater treatment plants to reduce sludge disposal costs and at the same time protect the environment. Previously, primarily smaller sewage treatment plants and particularly plants in Germany and France have used solar sewage sludge dryers. Today, even operators of medium-sized and large wastewater treatment plants from all over the world order solar dryers.

For more than a year a HUBER solar dryer has been in operation in a tropical climate zone at Cali, a large city in

Colombia. The dryer handles a wastewater flow in excess of 5 m³/s. High solar radiation combined with an additional heating render it possible to process up to 60 m³/s press sludge on some days. Four type SRT 9 machines are installed at Cali to dry the sludge directly at source and use it as fertilizer for the production of sugarcane. Previously, the sludge had to be transported to a landfill by trucks, which was quite an expensive solution. First tests seem to prove that hygiene standards as high as Class A can be met even under such tropical conditions. Sludge feeding at Cali has been automated – a elegant and economical solution even for large plants. An about 50 m long conveying belt has been installed to transport the sludge from the existing dewatering building to the new greenhouses where the sludge is distributed to individual treatment lines to be processed by the HUBER machines. In this way the fully automated solar drying system could be integrated into the customer's existing system.

If maintenance work needs to be carried out on the conveying belt, each line can optionally be fed with a wheel loader. At the push of a button plant control can be changed from automatic 'slice by slice' feeding to wheel loader feeding to process bigger sludge volumes. The system remains operable even if individual aggregates should fail temporarily. After 100 m in the drying bed the sludge is all dry and automatically transported to a storage tank. Again, the dryer remains operable even if



Solar dryer under construction at Utah – a reasonable solution even in climate zones with cold winters

automatic dry sludge removal should fail. The sludge bed in the greenhouse would then grow and serve as a buffer. The dry sludge, reduced in mass and volume, is hygienic, usually harmless in hygiene/epidemic terms, and easy to process because it is a stable, free-flowing, pea size granulate. The dried sludge has become a valuable resource. After intermediate storage the dry sludge is further transported by trucks.

Another HUBER dryer is installed at Tooele, Utah on a dry high plateau near Salt Lake City. This medium-sized plant removes 1,000 tons dry mass a year from wastewater. The

complete sludge treatment stage has been redesigned. HUBER supplied not only three SRT 11 dryers but also two RoS3 dewatering units which are installed directly beside the greenhouses. The work on site is still going on, plant start-up is planned to take place in spring 2012. The combination of screw press and solar dryer offers the customers some advantages: The number of interfaces is minimized. The long operating times the screw press offers can be used fully because the solar dryer can continuously take up dewatered sludge. Both processes are well matched. The distance to be covered by conveying systems is short. The solar dryer operates independently, dryer feeding is started by starting the screw presses. If the operator starts the screw press, he can take away dry granulate at the discharge end of the greenhouse. At Tooele the sludge is dried with solar power alone, this gives of course the best eco-balance. The energy consumption of the system is so low that it can be disregarded in the total cost balance. The customer had informed himself in detail about the solar drying systems available on the market and in the end consciously selected the HUBER solution. Quality, long life, robustness,

functions, reliability – these were the reasons that convinced him of our product.

The biggest HUBER solar dryer project is presently under construction at Zagan in Poland, located between Berlin and Wrocław. About 1000 t dry mass will be treated on this site with a cost-optimized technical solution. Three SRT 11 dryers will be installed in about 120 m long greenhouses. Wheel loaders will feed the sludge but the system offers the option for easy later automation. Also at Zagan the sludge will be dried with solar power alone.

In all three projects HUBER cooperates with local contractors who build the greenhouses and adjoining or auxiliary buildings or carry out concrete work, foundation work, wiring and installation. HUBER supports these contractors with technical drawings, check lists and consultancy to ensure problem-free project execution to the satisfaction of all parties involved. More than half the investment costs for the projects relate to local work. This percentage is even higher where feed and discharge automation is provided by the local contractor as it is the case at Cali for example.

All three projects show that solar drying works in very different climate zones and under very different conditions. Solar drying can be an economical and sustainable solution in all regions of the world. The HUBER system provides flexibility in the level of automation, it can easily be planned and installed by contractors. Also all the inquiries we receive from different countries indicate that solar drying on medium-sized and bigger wastewater treatment plants can be a reasonable sludge treatment solution. With our excellent core products we are able to offer HUBER solutions for any application.

Solar sewage sludge drying is the same simple principle as drying clothes on a line: It is easier to use the power of the sun to remove the water from the sludge than to apply complex technical systems.



The sun makes sludge a valuable resource: the solar dryer at Cali produces fertilizer

New TrashMax® screen for the reliable removal of bulky coarse material

Sturdy screen for coarse material removal



HUBER is in the fortunate position of having a wide range of screens which allows us to offer every customer the perfect solution for his specific requirements. This guarantees our customers problem-free plant operation. On the basis of the function principle of our multi-rake bar screen we have developed the new coarse material screen TrashMax®. The TrashMax® screen offers all the benefits of our multi-rake bar screens and in addition an extra sturdy design for the removal of coarse material. The screen is ideal to be used in pumping stations, as first treatment stage of wastewater treatment plants or industrial plants, and in the inlet to power plants. It removes coarse and bulky material and therefore protects downstream systems.

An important functional element of the screen is its bar rack which retains the coarse material. The screen rakes of the TrashMax® screen mesh with the rack bars at the bottom dead centre, at first with the

back cleaned screen and then with the behind front cleaned screen. This avoids the accumulation of material in front of the screen and even extremely bulky objects are reliably removed by the screen rakes and transported upwards out of the channel. As the screen rack gets more and more blinded, flow resistance increases and consequently the water level in the channel in front of the screen rises due to the accumulating material. The HUBER TrashMax® screen is able to remove this material very quickly and thus reduce the water level within a short time. The TrashMax® achieves this with its cleaning elements. Attached to the chain system, these elements can easily be adjusted to different requirements and are therefore able to reliably remove even heavy loads and bulky screenings. As the cleaning rakes can be variably adapted, removal capacity is then adjustable. The benefit of high cleaning efficiency is especially favourable for high solids loads.



Schematic drawing of a TrashMax® screen

Both ends of the cleaning rakes are connected to robust drive chains. Two wear-resistant rollers on each side, running in lateral guiding tracks, ensure true and smooth running of the rakes as they move upwards with the result of reliable intensive bar rack cleaning. Each chain is driven by a sprocket on a common shaft and a gear motor. Frequently, screens need to be adaptable to specific site requirements. Especially with given hydraulic and structural conditions the TrashMax® screen is ideal due to

its versatility and flexibility. Due to the screen's compact design its height above floor is very low. Also screen installation length is very short as the screen can be installed at angles between 70° and 85°. In short: With this screen type, solutions can be provided for virtually any application, even and especially with given hydraulic and constructional conditions.

As described above, the screen rakes attached to the chain system reliably

ensure continuous bar rack cleaning with short removal intervals. The lower part of the TrashMax® consists in the steep conveying section followed by the upper part, the flat discharge section with a small inclination. This screen design guarantees the reliable discharge of screenings into a downstream transport or disposal system. With the development of the new TrashMax® screen HUBER has successfully added another innovative coarse material screen to its program of screening solutions.

30% increase in screening surface with star-shaped screen drum

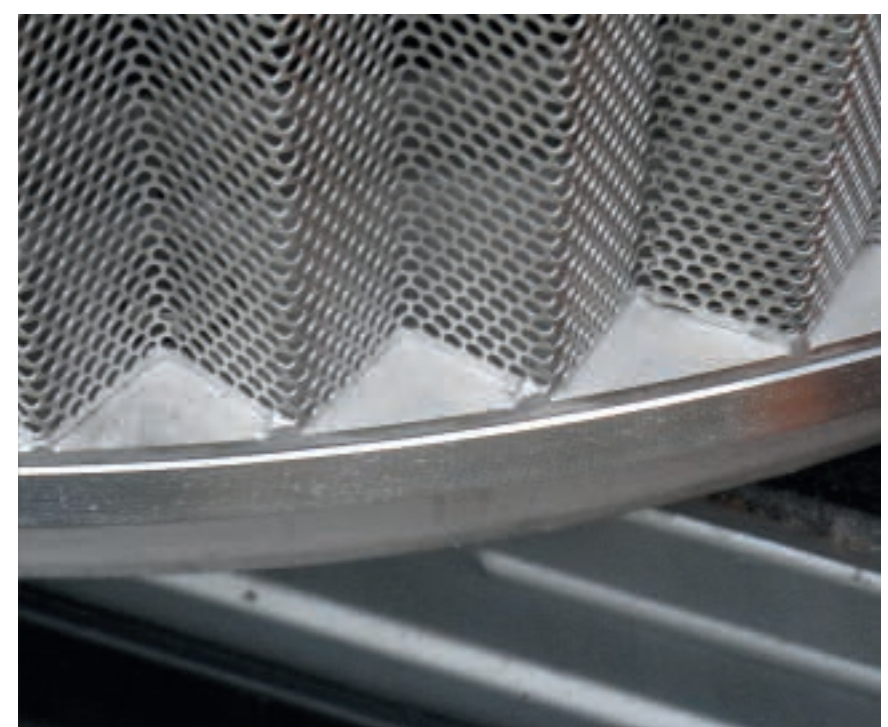
Further developed ROTAMAT® Rotary Drum Fine Screen with increased hydraulic capacity: ROTAMAT® Perforated Plate Screen RPPS-Star



These screens with a two-dimensional perforated plate rely on the unique system of HUBER ROTAMAT® machines which combines screening, washing, transport, compaction and dewatering in a single unit. Additional advantages, such as shear-force resistant and wear resistant screen surface cleaning and a high frequency of screen surface cleaning per minute, guarantee maximum efficiency and operating reliability. Perforated plate for two-dimensional screenings is primarily used for screens with apertures > 1 mm. For finer screening < 1 mm we use the newly developed ROTAMAT® Membrane Screen RoMem with filter mesh. HUBER ROTAMAT® Perforated Plate Screen RPPS units are equipped with 1 to 5 mm perforated plate. The selection of the mesh size or perfora-

tion depends on to what extent hairs and fibres must be removed to meet the specific requirements of the downstream clarification systems.

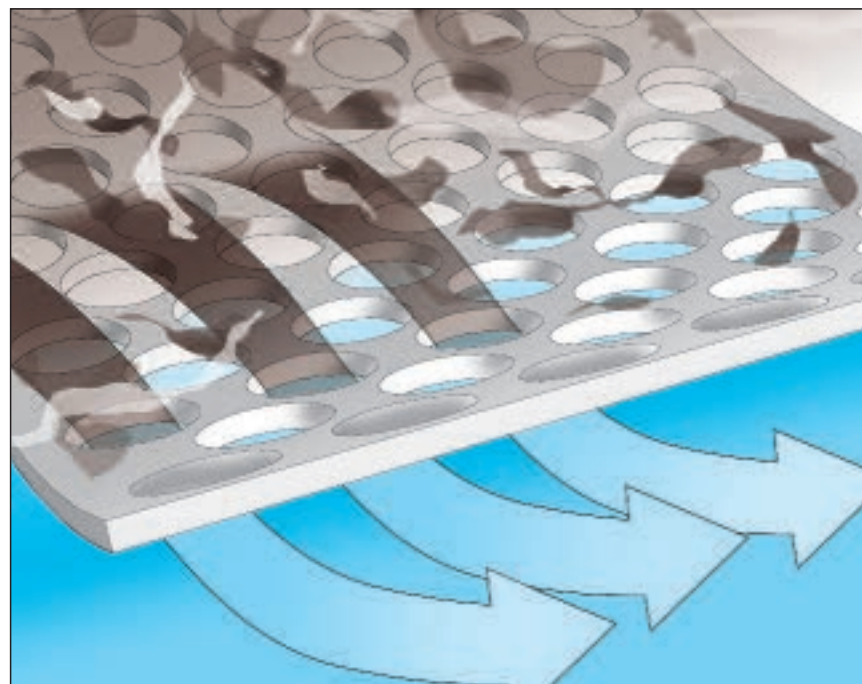
Two-dimensional perforated plate screens achieve a high removal of hairs and fibres, i.e. two to four times the amount of solids are removed than one-dimensional screens are able to separate. The significantly increased separation efficiency is accompanied by a high level of screen surface blinding and requires larger dimensioning of the fine screens compared to other commonly known wedge wire screens. Conventionally, a screen basket with bigger external dimensions is used to achieve larger dimensioning with the result of significantly increased investment costs and even building



Star-shaped screen drum of the ROTAMAT® Perforated Plate Screen RPPS-Star

On the basis of the worldwide known and well-proven system of HUBER ROTAMAT® fine screens with wedge wire screen basket we developed the ultra-fine ROTAMAT® Perforated Plate Screen RPPS with perforated plate. The two-dimensional screen (perforated plate) ensures the reliable removal of hairs and fibres and avoids that:

- fibres and hairs hinder the stable operation of membrane plants and increase maintenance requirements, these materials tend to entangle on the membranes and lead to reduced membrane plant efficiency
- these products form tresses in the wastewater treatment plant, this would impair oxygen supply to the aeration system with the result of problems occurring in the sludge treatment line



Two-dimensional screen basket of a ROTAMAT® Perforated Plate Screen RPPS

costs as a bigger channel is required. We have solved this problem with our ROTAMAT® Perforated Plate Screen RPPS-Star: The perforated plate of the screen basket is folded in axial direction like an accordion. The zig-zag folds form the star-shaped screen basket (RPPS-Star). This increases the screen basket surface by about 30% with still the same nominal diameter.

The filter drum of the ROTAMAT® Perforated Plate Screen RPPS-Star is cleaned by a water jet spraying against wastewater flow direction. This ensures that fibres and screenings are reliably washed from the drum surface and removed by the centrally arranged conveying screw. With this innovation we have made a

'traditional' machine fit for the future. We are well prepared for higher future requirements related to separation efficiency and hydraulic throughput. The extensive experience gathered from real size installations is reflected in the continuous development and optimisation of our fine screens.

Compared to one-dimensional wedge wire screens, the two-dimensional perforated plate screen achieves a significantly higher separation efficiency. Due to its star-shaped screen drum the ROTAMAT® Perforated Plate Screen RPPS-Star has a by about 30% larger screening surface, with the same small nominal diameter and with the result of a significantly increased hydraulic throughput capacity.

HUBER USA successfully placed the company's largest HUBER RakeMax® screens to date into the market in Louisville, Kentucky

HUBER project in Louisville, USA



HUBER USA successfully placed the company's largest HUBER RakeMax® screens to date into the market in Louisville, Kentucky. The three RakeMax® 22300 x 2752 x 13 screens were installed at the Derek R. Guthrie Water Quality Treatment Center in Louisville, KY with official startup currently scheduled for spring 2012.

Along with the growing awareness of the reliability and robustness of HUBER products in the USA market, the inclusion of our equipment in large-scale projects has become increasingly popular. As evidence of this trend, HUBER USA received the order to supply 3 RakeMax® size 22300x2752x13 to the Derek R. Guthrie Water Quality Treatment Center which is situated 30 kilometers

south of Louisville, Kentucky, 136 meters above sea level. Each screen is rated for 7,6 m³/s and this installation is part of a \$850 million Integrated Overflow Abatement Plan intended to improve water quality in the greater Louisville area. These improvements are mandated (but not funded) by the United States government (EPA).

During dry weather the Derek R. Guthrie Water Quality Treatment Center receives approximately 0,88 m³/s of wastewater flow. All sewers that serve this plant are separate from the storm water system. However, a portion of the greater Louisville wastewater collection system utilizes a combined sewer system and, during wet weather flows, those areas direct

flow to the City's Morris Forman Wastewater Plant located a few kilometers west of Louisville. When maximum permitted flows are reached at the Morris Forman Wastewater Treatment Plant, additional flow is diverted to the Derek R. Guthrie Water Quality Treatment Center where up to 13,1 m³/s will be treated through the HUBER RakeMax® screens.



The plant in Louisville, Kentucky



The plant in Louisville, Kentucky

The expansion of the Derek R. Guthrie Water Quality Treatment Center to handle wet weather flows will benefit everyone in the Louisville community. Large wet weather flows will be treated and discharged to the Ohio River rather than allowed to overflow into the region's streams. This project represents the second largest capital expenditure in the Louisville Metropolitan Sewer District's history and is a major component of a federal consent decree to clean streams, eliminate sanitary sewer overflows, and minimize combined sewer overflows in the Louisville area.

At the planned start-up date in spring 2012, the improved Derek R. Guthrie Water Quality Treatment Center with

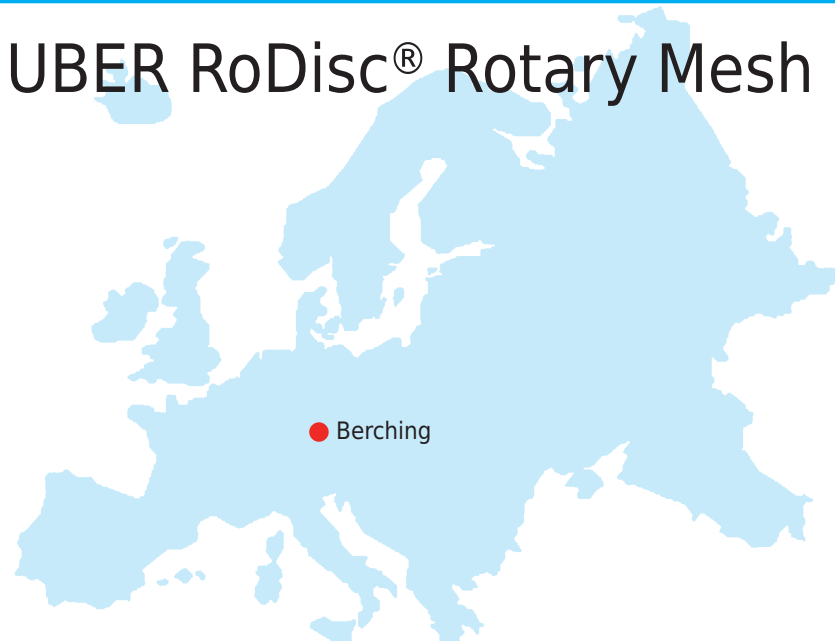
the HUBER RakeMax® screens will go into service. HUBER is now an essential part of a large effort to improve water quality in the greater Louisville area and all parties involved with this order expect the project to become a reference that will generate follow-up orders.

Facts and Figures

- 3 x HUBER RakeMax® 22300x2752x13
- Max. flow per machine: 7,665 l/s (175MGD)
- Start-up: spring 2012

Tertiary filter stage to upgrade wastewater treatment plants with insufficient effluent quality

HUBER RoDisc® Rotary Mesh Screen as tertiary filter stage



The HUBER RoDisc® Rotary Mesh Screen is a quick and efficient solution if you want to upgrade your wastewater treatment plant and ensure to produce a virtually solids-free effluent. Upgrading is especially required if the secondary clarifier does not work effectively and flocks pass into the channel. Our micro screen prevents concentration of suspended material, significantly improves

effluent quality and thus substantially contributes to the protection of our waters.

The installation of a filter stage downstream of the secondary clarifier is an efficient and inexpensive option to upgrade a wastewater treatment plant. Insufficient tank depth, high hydraulic loads or the poor settling behaviour of activated

sludge are the most frequent reasons why wastewater treatment plants are sometimes unable to reliably meet today's minimum requirements on the concentration of filterable solids in the effluent. The overflow of flocks increases COD, BOD, N and P loads in the effluent and receiving water course with the result of increased discharge fees. A HUBER RoDisc® Rotary Mesh Screen as tertiary filter stage is able to guarantee a virtually solids-free WWTP effluent. Due to the gravity flow through our RoDisc® Rotary Mesh Screen and its low pressure loss the screen can easily be integrated into existing sewage treatment plants. Due to its small space requirements and modular design the RoDisc® Micro Screen can be tailored to suit any specific site requirements and keeps the structural alteration work required to a minimum.

An ineffectively working secondary clarifier is however not the only reason for upgrading a wastewater treatment plant with a downstream micro screen. Especially the accumulation



RoDisc® Rotary Mesh Screen for the retention of activated sludge flocks



28 RoDisc® Rotary Mesh Screen units with 24 discs each treating about 8.5 m³ wastewater per second

of the nutrients phosphate and nitrate in surface waters can lead to eutrophication, growth of algae and water plants, oxygen depletion, and to fish dying and death of other water animals. Combined with precipitation and flocculation the micro screen can reduce phosphorus to a very low concentration. Precipitants transform the orthophosphate contained within the wastewater to hardly water-soluble materials. Flocculants transform the produced micro flocks to macro flocks which can be removed by the micro screen.

The HUBER RoDisc® Rotary Mesh Screen meets not only the requirements of today but sets the course for the future. Many of the methods for advanced wastewater treatment which are increasingly used today, such as disinfection and reduction of organic trace substances, require prior micro screening. UV disinfection

systems for example need a virtually solids-free flow to work effectively. Frequently, activated carbon powder is used to reduce organic trace substances to release the load in our waters. Reliable removal of the activated carbon powder laden with the removed organics is then required. The HUBER RoDisc® Rotary Mesh Screen ensures that virtually all suspended materials are removed from the wastewater so that additional downstream treatment stages can be operated. Investment and operation costs for micro screenings are usually more than compensated because micro screening saves the money for additional plant components. Micro screening substantially contributes to the protection of our waters, today and in the future. So, the option of a filtration stage should definitely be considered when planning to expand or upgrade a wastewater treatment plant.

What should a good grit washer be able to do?

Separate the wheat from the chaff



Berching

When we launched our COANDA Grit Washer in 1994 and started its success story it was not long before competitors came up with their own grit washers. In the beginning, most of them fortunately did not know what exactly to think about our product. But as the demand from the market increased all our 'friends,' one after the other, became active, at first in Germany, the 'birthplace' of this innovation, later also abroad where there are often no scruples to copy as we all know well.

But no other grit washer would even come close to being comparable with our COANDA Grit Washer in terms of function and efficiency. There are some factors that always must be taken into account to evaluate the quality of a grit washer: separation efficiency, washing efficiency (quality of washed grit), wear resistance. HUBER has meanwhile sold almost 2,000 COANDA Grit Washer units.

Separation efficiency:

The separation efficiency of a grit washer depends on the feeding arrangement, surface loading and effluent quality. But what needs to be available as well is a separation chamber, i.e. a water volume which allows the solids (here grit and organics) to settle quickly. An efficient grit washer achieves a constantly high separation of organic material. We have carried out measurements on our own test stand. Both our results and external measurements at a university prove that central feeding through a vortex chamber and a COANDA Tulip provides optimal pre-conditions for good separation results. This advantageous feeding arrangement, combined with a large water surface (low surface overflow rate) and a circumferential overflow weir, significantly reduces the velocity from the inlet to the outlet weir so that grit particles > 200 µm are reliably separated. The use of an overflow weir avoids the suction effect, i.e. the acceleration of outflow water. However, even the best dimensioned grit washer will not achieve satisfactory separation results if there is not enough room for sedimentation. It is generally known that a lot of heavy organic particles settle with the fine sand which can only be 'blown out' of the plant if the velocity is increased. But this phenomenon

would lead to the loss of the fine sand spectrum from 200 to 350 µm. With the use of our patented organics discharge solution heavy organic particles are simply removed at the end of the washing process to guarantee an always optimal room for sedimentation for all particles.

Washing efficiency:

Although our patent gives us comprehensive copy protection and prevents completely uncontrolled copying, each of our competitors tries to somehow get around one distinct patent claim. But, in the end, all grit washers have a conical tank with an inclined grit removal screw, a pressure probe and an organics discharge installed on the tank, without knowing what it is actually good for.

Some have tried to replace the stirrer with pressure air without taking into account that the pressure probe will not deliver continuously stable measurements any more. Former colleagues have tried to install only distribution channels in the wash zone where we use our patented perforated plate bottom solution. Their system cannot create a steady fluidized bed with the result that their plant sometimes washes but sometimes by far fails to achieve the guaranteed loss on ignition of < 3%. Others have tried their luck with a fast running stirrer (40 rpm) to achieve fluidisation and wash the grit. At such a speed, however, the pressure probe in the tank is not able to deliver reliable measurements and there is also enormous wear.

Most competitive product do not at all care about a homogenous fluidized bed but stir the settled solids without interruption. This may work as long as there is hardly any grit to wash but if there is more grit the removal screw will discharge the grit along with the organics like a classifier or the grit will leave the plant via the outlet, and it all ends up again with 'There is no grit!'. There is a litany of how competitors try to wash grit and it would go beyond the scope of this article to mention them all, except that some of our 'smart' international competitors copy our COANDA Grit Washer



Picture 1: Do you want to separate grit or waste space with empty containers?

1:1 at least in appearance but unfortunately have neither the required know-how or any clue about proper control of grit washing processes.

Wear protection:

Grit is a very critical material and causes wear especially when it is moving. After all, complex grit traps are used on many sewage treatment plants with good reason to improve the service life of pumps and pipelines. That is why we attached great importance to wear protection right from the beginning. We avoid high relative speeds of the rotating aggregates (stirrer, screw) of our COANDA Grit Washer and the grit removal screw has high-quality journal bearings on both ends (silicon carbide / chilled cast iron bearings) so that the auger does not scratch the trough walls. Welded conveyance bars, plastic shells or cheap bearings should have no place in grit handling systems. The stirrer in the COANDA Grit Washer always operates in a homogenous grit fluidized bed so that the fluidized grit offers only little resistance to the stirrer arms. But as some wear cannot completely be avoided all stirrer arms of our COANDA Grit Washer units are made of 30 mm dia-

meter full material. Due to the low relative velocity and the massive materials used we can guarantee a service life of about 20,000 operation hours.

Conclusion:

If you are interested in buying a grit washer, check offers for the features a good grit washer should provide:

- low surface overflow rate
- circumferential overflow weir
- separate organics discharge
- grit washing and removal even during feeding
- washing function / fluidisation
- grit removal screw supported on both ends
- high solids throughput

Rely on our expertise in grit washing. You can be sure to be in best hands (pic. 2). We do not want to sell some hundred kilos of stainless steel to our customers but provide them with a technical solution that really helps them to save a lot of disposal costs. We are true to our word.



Picture 2: Superior function and grit yield

Maximum benefit from HUBER Wash Press WAP with more than 4,000 mm feed through length installed in Finland

Continued success of HUBER Wash Press WAP



Jyväskylä

The increasing demand for economical machines produces a variety of innovative technical solutions, such as on WWTP Jyväskylä for example. Jyväskylä is Finland's seventh largest city and located in central Finland.

In summer 2011, the two 3 mm step screens previously installed on site were replaced by two HUBER EscaMax® screens with 6 mm perforation. A HUBER Wash Press WAP with extra long feed trough could successfully be used for the screen's discharge width of 2 x 1,552 mm. The size 4 Wash Press has a feed trough length of 4,200 mm and is able to handle the maximum screenings throughput of 4 m³/h. If the HUBER EscaMax® screens



WAP with extra long feed trough up to 4,200 mm maximum has proven well for size 4 with standard guarantee values

are operated continuously, a wash water amount of about 3 l/s is generated by the spray nozzle bars of the two screens. This amount is easily handled by the Wash Press.

Facts and figures installed machines:

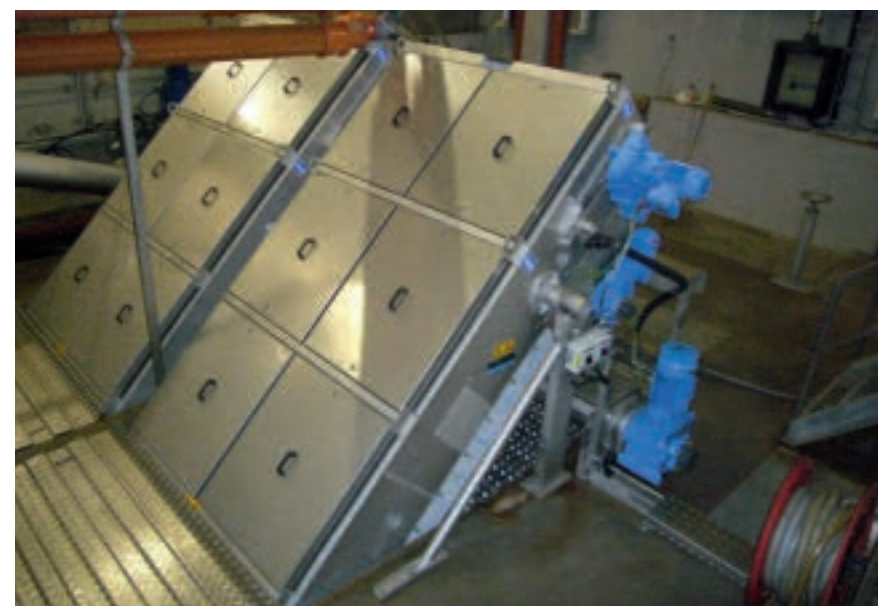
- 2 x EscaMax® 5,000 x 1,552 x 6
- 1 x WAP size 4 with extra long feed trough 4,200 mm

- 1 x Ro 8t
- 1 x WAP/SL size 2
- 1 x RoS 2 size 4

The 6 mm HUBER Belt Screen EscaMax® with perforated plate increases separation efficiency and generates therefore twice the amount of screenings of a 3 mm step screen. It must

be considered that a 3 mm step screen is able to achieve comparable separation degrees provided impoundage level and filter carpet formation are optimal.

It should also be mentioned that 4,200 mm feed trough length has proven well as maximum feed trough length for WAPs size 4.



Successful installation of a WAP 4 with 4,200 mm feed trough length for 2 EscaMax® screens, size 5000x1552x6

Unbeatable also in Spain

Sewer grit treatment system on the Iberian Peninsula



lities of Irun and Ondarrabia.

Just a year later the municipality of San Sebastián, only about 30 km west of Irun, was also faced with problematic sewer grit – which nobody wants to have. It should be noted by the way that the Atlantic coast in northern Spain is one of the country's most beautiful tourist regions. For this reason, and in view of ever increasing disposal costs, it seems not reasonable any more to landfill sewer grit. The municipality of San Sebastián contacted therefore Servicios de Txingudi and they carried out trial operations with the material from Aguas del Añarbe on WWTP Irun. Aguas del Añarbe is the name of the plant operators in San Sebastián. Test results were positive as we had expected because our system components are designed to treat such critical material.

The HUBER sewer grit treatment system RoSF5/H has instantly had the success our German, national football team has been running after for years but somehow cannot seem to reach: It came. It was seen. It won.

The first sewer grit treatment plant in Spain was put into operation at the end of 2007 in a pumping station of the town Irun. Irun is located in picturesque scenery directly on the Atlantic coast and on the border to France. The sewer grit treatment plant consists of several well-known standardised HUBER grit treatment products: RoSF7 grit acceptance tank, RoSF9 wash drum, RoSF4 grit washer. The plant is installed underground and absorbs virtually everything coming from the sewer. The owner of the plant is the company Servicios de Txingudi which is in charge of water supply, wastewater treatment and waste management in the municipa-

Once they knew that the HUBER plant is able to produce recyclable material from sewer grit, the municipality of San Sebastián issued a public invitation to tender at the beginning of 2009. It was the company Aqualia that won the tender and was commissioned to execute the project on the basis of the Irun example. Of course, bigger units had to be used due to high throughput requirements (3 m³/h raw material) but this was no problem with the modular HUBER system. Aqualia ordered the machines and electrical equipment in June 2009, HUBER supplied the equipment already in October 2009. Also the installation time was very short so that the complete plant could be put into operation in December.

Since that day up to 80 sewer cleaning vehicles a month discharge their load into the HUBER plant. The

material comes mainly from the sewer system of San Sebastián and from several of the municipality's pumping stations. Via a separate line the tanker vehicles press the liquid phase directly into the RoSF9 wash drum. This reduces odours and significantly improves the hygiene situation for the operating staff. The solids in the tanker vehicles are then emptied into the RoSF7 acceptance tank with a storage volume of 16 m³ from where they are discontinuously fed to the treatment plant. The RoSF9 wash drum (1,650 mm dia.) removes and washes out all disturbing material bigger than 10 mm. Along with the screenings this material is transported to a landfill for further treatment. A cantilever pump delivers the grit fraction in the underflow of the RoSF9 wash drum into the RoSF4 grit washer (3 t/h throughput) where the grit is separated, washed and dewatered.

It goes without saying that the washed grit has a loss of ignition below 3%. The treated grit is stored on the WWTP to be used as secondary building material.

With this sewer grit treatment plant San Sebastián found a quick response to the rising disposal costs in Spain. Even the local TV station reported about this great, innovative solution. Half a year later HUBER Spain received the order for another complete sewage grit treatment plant for WWTP Arazuri at Pamplona. The machines supplied to Arazuri have meanwhile been put into operation.

Advantages of HUBER sewer grit treatment plants:

- All contents of tanker vehicles can be treated in one place
- No water or sludge hinders solids transport
- No annoying puddles of water at the deepest point of the tank
- Big aggregates ensure reliable material flow and easy operation
- No installation of different metallic materials (no carbon steel)
- Best clarification results for safe utilisation

It is a pity that the financial crisis inhibits important investments into environmental protection also in Spain. But time never stands still, sooner or later customers will invest in our treatment technology.



The acceptance area of the sewer grit treatment plant at San Sebastián

Cost-effective screenings treatment for any application

Increased gas yield with WAP/SL



Germany's energy turnaround is a reason for many wastewater treatment plant operators to try to improve their energy situation and take great efforts to cover the electric energy they need themselves. There are two approaches how to achieve

this ambitious goal: save energy and/or increase own energy production. This article describes how to produce more digester gas, and thus more regenerative energy, through optimal screenings treatment with a HUBER WAP/SL Wash Press.

Use a WAP/SL to increase digester gas yield by up to 38,000 Nm³/a

The HUBER Screenings Wash Press WAP/SL is able to achieve a virtually complete washout of organics from screenings. This returned carbon load is available as an additional source for digester gas production.

We have proven in both laboratory and practical tests on a wastewater treatment plant in Bavaria that this effect occurs with significant intensity also in practice. This 18,000 PE wastewater treatment plant has a rather short sewer system and the load of faeces contained within the screenings is very high. The faeces washed out from the screenings consist primarily in organic carbon. The microorganisms inside the digester transform this organic carbon into methane. After every wash cycle of the WAP/SL the sludgy wash water with its high organic load is introduced into the channel downstream of the screen. All settleable material settles there and the sediments are passed on to the digester as primary sludge.

Results

Results have shown that digester gas yield can be increased by up to 20% with the use of a HUBER Wash Press WAP/SL, which means an additional gas yield of up to 104 Nm³ per day. As the produced digester gas is used to operate a block heat and power plant, more gas means also more energy and heat. The additionally produced power can be used on site or fed to the power network. Up to 15,000 euros per year can be saved in this way.

The benefits of screenings treatment with a WAP/SL Wash Press



The wash water with its high carbon load is returned to improve denitrification and gas yield

When evaluating the economic efficiency of screenings treatment the focus has previously been on weight/volume reduction, which is up to 70% with a WAP/SL, depending on DS content. Volume and weight reduction reduces both the volume of screenings that require expensive disposal and the number of disposal transports required. But a holistic evaluation of economic efficiency should also include the advantage of an increased yield of energy in the

form of gas, power and heat. The HUBER Wash Press WAP/SL is an option for sewage treatment plant operators to take another step towards an energy self-sufficient wastewater treatment plant. If we take into account the costs that can be saved through reduced disposal costs and the additional money that can be earned with the additional energy produced, the payback period of the investment can significantly be revised downward.



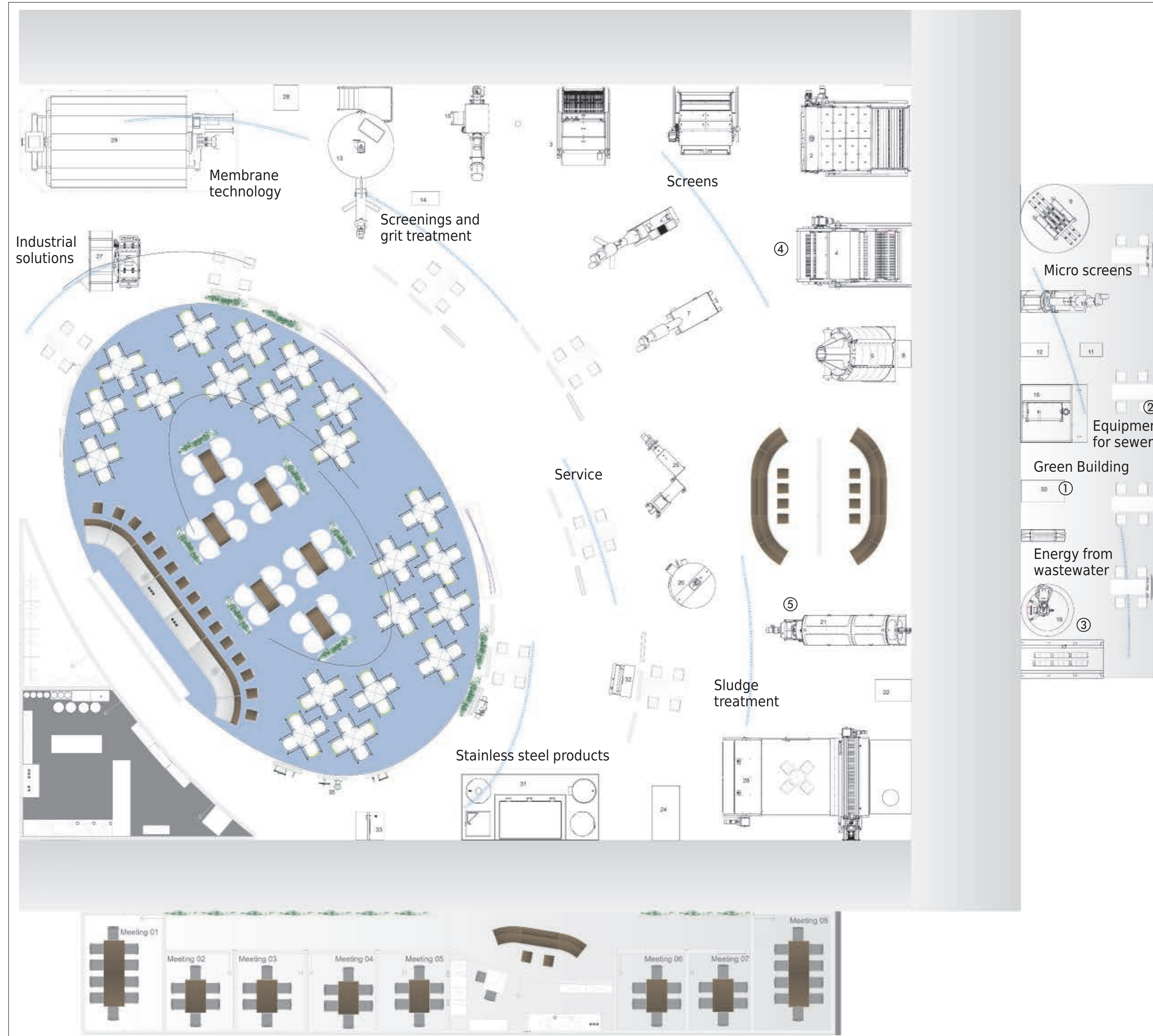
HUBER Screenings Wash Press WAP/SL units with powerful high-turbulence washing for throughputs up to 12 m³/h installed in Finland

HUBER exhibits at IFAT 2012 from 7 to 11 May in hall A2, stand no. 333

Novelties and innovative products on the HUBER stand

Our stand at the IFAT 2012

Innovative solutions to increase water and energy efficiency



Climate change, demographic development and ever scarcer resources including water have more and more impact on water management. New challenges have to be met in the field of wastewater disposal, wastewater treatment and treatment of the residual materials generated in these processes. Particularly efficiency of resources and energy as well as energy recovery are aspects that have to be taken into account when developing intelligent and innovative future solutions.

HUBER SE have responded to these new challenges and developed several innovative products. These carefully designed solutions are easy to install and operate and provide high economic efficiency whilst maintaining the high quality, long life and technical standards for which HUBER is known. HUBER will present these solutions and their complete range on 1,000 m² booth area to the visitors of IFAT Entsorga 2012 which takes place in Munich from 7 to 11 May (hall A2, booth no. 333).

① HUBER smartMBR – a new range in the service of water recycling

In the world's ever growing cities and in many touristic regions water shortage is assuming alarming proportions for the people living there. Reuse of treated high-quality wastewater is therefore the order of the day. Treated wastewater is frequently the only reliable source for service water as it is a resource of calculable availability.

Limiting conditions are in most cases limited space, expensive land, the requirement of noiseless and odourless operation and use of treated wastewater without any health risk. The only modern wastewater treatment system that is able to meet these requirements is the MBR system. HUBER have responded to this demand with the launch of the 'smartMBR' range of standardised wastewater treatment & recycling systems which provide cost-effective and economical solutions for small wastewater volumes.

The smartMBR systems have been carefully designed so they are attractive looking and simple to install and operate, whilst maintaining the high quality and technical standards for which HUBER have been known for many years. The smartMBR systems come in 6 standard sizes, ranging in daily treatment capacity from 10 m³ to 74 m³. They are intended for worldwide use in apartment buildings, office buildings, hotels, etc.

The standardised systems offer best value, quick transport and installation, and easy start-up. The units are completely made of stainless steel to ensure high product quality and a long product life..

② HUBER Power Flush for pleasant smelling sewers

The population is decreasing in some European cities, dry periods are lasting longer and longer and occur more and more often. Each of these factors alone can cause severe problems with unpleasant smells drifting

through the streets and annoying the people living there. But the situation is getting even more dramatic when both occur together. Bad smelling sediments in sewers hide another potential risk that however remains invisible: They are perfect food for vermin and rats. That is why sewer cleaning is obligatory in Germany and is preferably carried out with high pressure. But due to their high fresh water demand these techniques are not state-of-the-art any more. In addition, they lead to extremely unhygienic working conditions. The newly developed HUBER Power Flush® is the technical solution that now defines the new state-of-the-art technology. The HUBER Power Flush® with its flushing gate removes not only existing sediments very reliably but even prevents future sedimentation. Due to this innovative solution sewer flushing is even independent of storm water impacts. In addition, the frameless flushing gate has been designed very carefully to prevent the formation of plaits or tresses.

The special challenges the design engineers were faced with were to ensure the system can be retrofitted without interrupting sewer operation, the stainless steel flushing gate can be used for all sewer sizes, and the system can be operated even with a minimum of energy – and they have done excellent work and could solve all these problems.

③ HUBER TubeWin – for heat should not be flushed away

More and more municipalities realise the energy potential that is hidden in their wastewaters but runs off through the sewer system and is lost while they could perfectly use it to heat high-rise buildings or large office buildings. That is why HUBER successfully launched their RoWin Heat Exchanger recently. The HUBER RoWin Heat Exchanger is designed for installation outside the sewer system.

But in some cases there are limiting factors which make this efficient outdoor installation impossible: limited space, sewer situation, availability of local heat utilisation. The HUBER engineers have responded to this situation and developed a modular heat exchanger element to continue the triumphant success of 'energy recovery from sewers'.

The HUBER TubeWin Heat Exchanger can very easily be installed in the sewer, irrespective of sewer shape and diameter. It is continuously immersed in wastewater whilst preventing sewer clogging caused by materials contained within the wastewater. The complete process of heat exchange takes place in an intelligent way inside the sewer. The system length can easily be extended to meet specific installation requirements.

A heat pump ensures that the energy extracted from the wastewater flow is heated to a useful temperature of 35 to 55 °C. Expensive energy from shower and cooking wastewaters can be returned to the heat cycle of the building. This is not only a benefit for the environment but also easy on the purse of building operators.

④ HUBER TrashMax® – a screen of the special kind

They normally do their job unobtrusively on all of their 24-hour work days: Year by year, screens ensure problem-free treatment of wastewater on sewage treatment plants. It is only possible to develop a screen which is sturdy enough to do this job if specialist knowledge in wastewater engineering, many years of experience and the expertise of smart design engineers are combined. The new HUBER TrashMax® is a perfect result of such cross-discipline cooperation.

What is spectacular, however, are the screen's innovative details. Its high-quality design minimises the energy demand of the screen rakes which remove all coarse material contained within the wastewater and are able to take up big volumes of material compared to competitive products.

Even bulky objects are removed reliably and completely. Efficient and reliable bar rack cleaning ensures high operating reliability, the choice of the right materials for the machine combined with its operation principle ensures that its reliability remains at the same high level for the complete product life.

⑤ HUBER Screw Press adds value to sludge

Sewage sludge is increasingly becoming the focus of energetic concepts when it comes to produce energy from organic solids contained within wastewater and excess microorganisms not only in the form of biogas. Careful separation of water and sludge is therefore required as first treatment stage for later sludge drying and incineration. Already at this stage the demand for energy and operating media decides about the ecological and economic efficiency of downstream treatment steps.

As the composition of wastewater can differ greatly, sewage sludge behaves very differently when it is mechanically dewatered. Many years of experience are necessary to develop technically mature high-performance products with a long life and low demand for energy and chemicals which are able to meet the high requirements of specific sludge properties. On the basis of the HUBER Screw Press RoS 3Q which has been successful in the market and well known among sewage sludge experts for many years, HUBER have developed the RoS 3Q 620 model which offers all the features for which HUBER screw presses are known and in addition meets the demand for simple maintenance in an optimal way.

Furthermore, the RoS 3Q 620 model excels for its high dewatering degree, low operator attendance requirements and minimised power consumption. With its throughput capacity of 100 to 300 kg DR per hour it is the optimal solution for all wastewater treatment plants designed for up to 50,000 PE.

Continued from page 1: Recovery of heat from wastewater: HUBER TubeWin Heat Exchanger

HUBER TubeWin Heat Exchanger



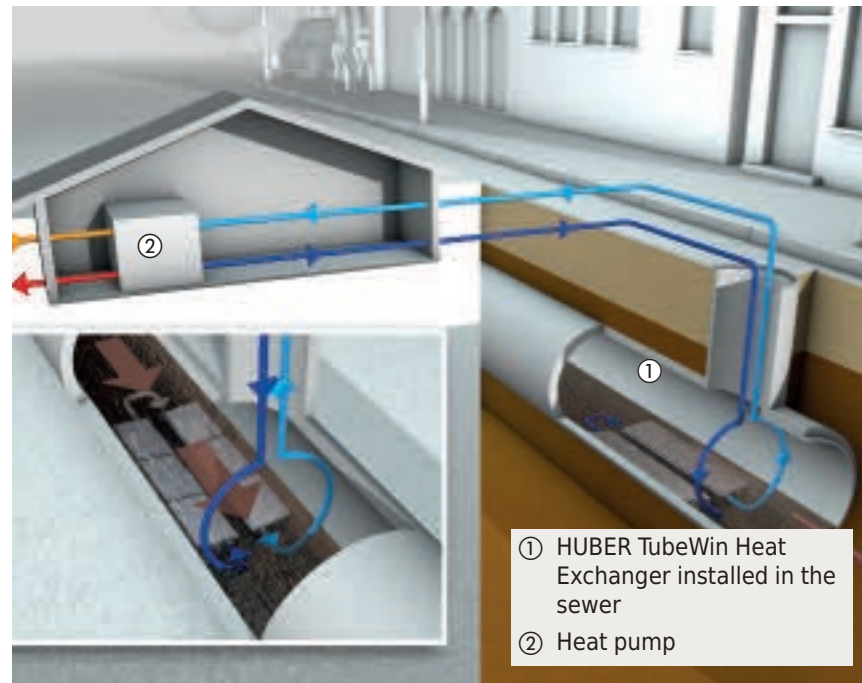
already. The thermal energy contained within wastewater has previously been lost for the residents of houses, flats and apartments once the wastewater had disappeared in the depths of the sewer system. This can be avoided with the use of a HUBER TubeWin Heat Exchanger. With its heat exchanger elements, which are mounted directly on the sewer bottom, it is possible to transfer the high thermal energy of municipal wastewater to a carrier medium (usually water). This special technique achieves that the energy can be used by a heat pump.

A heat pump works like a refrigerator just the other way round and using the energy of wastewater instead of a cooling room to generate heat energy with a temperature of 35 to 55 °C for the heating systems of houses. In this way up to 80% of the available energy originate from municipal wastewater. Such heat recovery saves money and protects the environment, both substantial arguments when it comes to the question of how to achieve climate policy goals.

Another advantage is that the heat exchanger elements do not need extra space as they are installed

Hot water is required in houses, apartments and public buildings all the year round. In addition to its use for heating in winter hot water is required for showers, cooking and laundry washing throughout the whole year. Even if excessive heat losses to the environment can be prevented through labour-intensive heat insulation of exterior facades and triple glazing, an enormous amount of energy still escapes through wastewater lines – energy which has been generated with the use of scarce resources and precious fossil fuels, such as oil or gas.

A new approach must therefore be found: Recycling solutions are required similar to how the waste management sector has actively protected the environment for many years



HUBER TubeWin Heat Exchanger in test operation

inside the sewer. The cooling water pipes up to the heat pump are installed underground and supply the pump with the required energy. Another advantage is that several HUBER TubeWin units can be installed in parallel or in series. The system cannot only be adapted to sewer shapes but also to specific wastewater parameters. As all lines are inside the modules, sewer cross sections remain virtually unaffected. Due to their flat and compact design the heat exchanger modules can be installed in sewers as small as DN 1000. They get fully immersed even with small flows.

The optimised flow inside the modules ensures that the flow covers the entire surface and minimises pressure losses. The cooling water flow is ideally adapted to the heat transfer unit to ensure the constant transfer of energy to the heat pump.

All components are made of V4A stainless steel for a long product life. The use of a HUBER TubeWin Heat Exchanger represents a sustainable and reliable solution of heat recovery from wastewater. Also this system can of course be used all year round, for heating and cooling. This is an aspect which significantly increases its economic efficiency additionally.

Leukerbad in Switzerland uses wastewater from thermal spa

Start-up of the first tank mounted HUBER RoWin Heat Exchanger unit



With this description and its breathtaking mountain scenery the idyllic village of Leukerbad in the Swiss canton Valais attracts thousands of guests every year, no matter whether they like winter sports or prefer hiking. But it was one sentence that attracted the attention of Picatech HUBER AG: "... an impressive 3.9 million litres of 51 °C hot thermal water ..."

Such enormous volumes of water with a very high temperature are ideal for the recovery of heat from wastewater. Even if it is not municipal wastewater with its typical pollutants, the spring water not only cools down but contains also grease and oil as well as skin particles from bathing activities. Due to these pollutants and the wash water of the filter plants conventional plate heat exchangers cannot be used. The risk of blocking and clogging of the narrow channels would be too high, not to talk of the

sediments on the heat exchanger surfaces and consequential decrease in heat transfer.

HUBER has developed the RoWin Heat Exchanger particularly for such problems. Its efficiency and reliability has already been proven impressively in several projects. Nevertheless, we still had to convince the Burgerbad spa operators in Leukerbad. The spa uses about 20 % of the thermal spring water to offer its guest superb relaxation in its wide choice of pools. Although the thermal water loses some of its energy in the pools, it leaves the spa with a temperature of more than 30 °C. The fact that this temperature level is sufficient to ensure the supply for a modern heating system shows the high energy potential of these thermal springs.

What distinguishes the Burgerbad project from previous projects is the

fact that it is the first project for which the tank version of the HUBER RoWin Heat Exchanger has been used. The heat exchanger modules are not mounted in a stainless steel tank as usual but directly in the concrete tank. It is therefore possible to install the modules underground. In this case they are installed in a tank below the parking area on the rear side of the spa. In order not to lose some of the parking area, the tank has load-bearing covers. So, it is out of sight but thanks to its excellent performance certainly never out of mind. As the water flows from the building by gravity there is no need for a pump to feed the heat exchangers, this saves energy and significantly improves efficiency.

The optimised interconnection of both heat exchangers ensures an output of 450 kW from a wastewater flow of 8 – 9 l/s. As about 300 kW are

added from an external energy source the heat pump receives 750 kW with a temperature of about 20 °C and generates a heat output in excess of 1 MW which is available to be used for heating purposes within the Burgerbad spa. It is therefore not only the spa guests who profit from the heat from the thermal springs but also the Burgerbad operators.

A natural energy source, all-year-round availability, heat exchangers installed in the outflow from the spa, a high coefficient of performance of the heat pump – this list of benefits could certainly be continued. The Burgerbad operators realised how profitable it is to use heat recovered from wastewater. Once this news has spread beyond the Valais, Burgerbad will certainly not remain the only spa that optimises its energy balance with a HUBER RoWin Heat Exchanger.

The small idyllic town Leukerbad is situated at 1,400 m in the Swiss Alps of the canton Valais. It is a skiing and holiday location with a natural thermal spring. The spring water is used in several therapeutic and recreation spas before it is discharged to the public sewer system where it arrives with a temperature higher than 30 °C. This temperature is ideal to use a HUBER RoWin Heat Exchanger.

Leukerbad is one of the largest spa & holiday resorts in the Alps with the most beautiful thermal baths in Switzerland. Whether for a recreational weekend or a longer stay, everyone will enjoy the rejuvenating thermal water, rich in minerals, from mountain springs. Leukerbad offers its visitors on 365 days a year a wide range of facilities to match every taste. With an impressive 3.9 million litres of 51 °C hot thermal water streaming into the pools every day Leukerbad has the most voluminous reserves of thermal water in the whole of Europe (source: www.leukerbad.ch).



Thermal spa Burgerbad at Leukerbad in summer



HUBER RoWin during installation

Guaranteed heat transfer performance through automatic surface cleaning – a unique design to recover green energy

HUBER RoWin Heat Exchangers are the solution in three projects for wastewater heat recovery in Switzerland



Winterthur

Every plant our customers buy contributes substantially to achieving CO₂ reduction goals. Here are some examples of such projects:

Utilisation of heat from wastewater for the Wintower high-rise building at Winterthur

22.000 m² is about the size of three football fields but is also the floor space of the 28 storeys of the Wintower in Winterthur, Switzerland. It is a real heating technology challenge to cool such a building in summer (= additional benefit) and heat it in cold winter months. About 600 kW heating energy is needed in winter. The HUBER ThermWin® system was installed and successfully put into operation at the beginning of this year.

An amount of approximately 50 l/s wastewater is taken from the sewer and pre-treated in a ROTAMAT® Pumping Stations Screen RoK4, size 4,700/3. Two submersible pumps deliver the water to the two RoWin Heat Exchangers size 8 installed in the cellar of the Wintower. Heat transfer to the cooling medium takes place inside the heat exchangers. The medium is heated and supplies the heat pump with the necessary

energy. About 600 kW are in this way provided for the heating system. The plant is also used for cooling in summer, extracting up to 600 kW from the building.

It is an ideal energy sink not only due to its far higher heat capacity but also due to its temperature of about 20 °C. All-year-round utilisation and high coefficients of performance of the heating/cooling machine guarantee high saving potentials so that investment costs pay off soon. Planned has been commissioned in April 2011.

Technical data:

- 2 RoWin Heat Exchanger units
- 1 HUBER Pumping Stations Screen RoK 4

Operating parameters:

- Load case heating:
 - Max. 480 kW extraction of heat from the wastewater
 - 585 kW heat input into the building
- Load case cooling:
 - 600 kW extraction of heat from the building
 - Max. 840 kW heat input into the wastewater
- Wastewater volume: Max. 50 l/s

Planned Utilisation of heat from wastewater in a wood processing industry

Can you imagine how much heat energy is hidden in a flow of 150 m³/h process-internal circulation water with a temperature between 50 °C



RoWin Heat Exchanger size 8 installed in the second basement of the Wintower building at Winterthur

and 58 °C, or how it is cooled by about 8 °C by the HUBER RoWin Heat Exchanger? About 1,200 kW of energy (cooling capacity) is available to heat the production halls and offices in a wood processing industry. The production plant operates 24 hours, its circulation water contains a lot of wood fibres and critical aggregates. Every type of heat exchanger tested before had the problem that its surface got almost completely blinded within a very short time. It turned out that only the HUBER RoWin Heat Exchanger with automatic surface cleaning and solids removal is able to ensure the reliable utilisation of waste heat. Basic tests over several weeks proved that the exchanger surfaces are perfectly cleaned every day and encrustation is reliably prevented. In summer, however, the circulation water sometimes reaches a temperature of up to 58 °C, which is a critical range that can have a negative impact on product quality.

It is therefore an obvious solution to utilise the HUBER RoWin Heat Exchangers in summer to cool the circulation water. This can be achieved by introducing the cooling water extracted from the nearby river to the secondary circuit of the same heat exchangers (= additional benefit). So, the huge waste heat potential can be used to heat buildings in winter and guarantee constant product quality in summer. Under economic aspects, there should be a strong incentive for the use of this system.

Technical data:

- 2 RoWin B Heat Exchanger units (tank design)

Operating parameters:

- Load case heating:
 - Max. heat extraction from wastewater: 1000 kW

Heat input into the building: 1300 kW

Max. process water flow: 42 l/s

➤ Load case heating:

extraction of heat from the building: 940 kW

Max. heat input into receiving water: 940 kW

Max. amount of process water: 17 l/s

Utilisation of heat from wastewater in the thermal spa Burgerbad at Leukerbad

Burgerbad is the biggest alpine thermal spa in Europe and uses a HUBER RoWin Heat Exchange to optimise its energy balance. Read the detailed article on page 10 to get the full story.

Other projects for wastewater heat utilisation in process

- Chemical production
- Potatoe processing industry
- Thermal spa
- Municipal wastewater upstream and downstream of a WWTP
- Sea water
- Paper production
- Slaughterhouse wastewater

The HUBER ThermWin® system with the RoWin Heat Exchanger in a tank or as a submerged version for sewers offers new solutions for the recovery of heat from wastewater and for cooling media that have been impossible previously.

Optimal flexibility with Complete Plants

Effective and sustainable flushing of sewers: HUBER Power Flush®



Berching

Sediments in sewers are one of the major problems with the operation of dewatering systems. Organic and inorganic sediments settle on the sewer bottom during dry weather or flushing of stormwater retention sewers, with very negative consequences. Efficient sewer flushing ensures lasting prevention of such sediments.

Cleaning of sewers and stormwater retention sewers has been gaining in importance recently. Sediments on the sewer base will harden and the material layers grow more and more

over the course of time. There are a number of reasons for sedimentation on the sewer base: Regular retention combined with a slow flow velocity especially in combined sewer systems leads to sedimentation of material which may contain also a huge amount of organic material. The subsequent reduced sewer cross section impairs system efficiency. Negative effects are the increase of stormwater overflow quantity discharged into the receiving water courses, high peak loads arriving at the wastewater treatment plant and sewer damage caused by wrong handling of high-pressure cleaners. But the sediments need to be removed to re-establish the efficiency of sewers. A number of measures are known to solve the problem. These solutions differ technically and in terms of economic efficiency. Although even the ancient Romans had used surge flushing to clean their Cloaca Maxima (literally 'greatest sewer') in Rome, it was only at the end of the seventies when this method was recovered as the German standards A 128 of the German Association for Water, Wastewater and Waste (DWA) were introduced for

cleaning storage and retention sewers of combined sewer systems. Today, sewer flushing is again a well-proven method to clean sewers and storage structures but available solutions and strategies differ considerably in terms of technical and economic efficiency.

In Germany, sewers are usually high-pressure cleaned. This method is also called an emergency strategy and consumes a lot of energy and fresh water. Furthermore, it is carried out under unhygienic working conditions, lacks the preventive aspect of avoiding sedimentation and involves a high risk of damaging sewer walls or connections if applied improperly. To ensure reliable system operation without sedimentation in the long run, the innovative HUBER Power Flush® has been developed for operators of sewer systems and sewers with storage capacity and overflow. The patented sewer flushing system allows for complete removal of sediments in sewers and even prevention of potential future sedimentation. The installation of flushing gates based on the principle of sewer flushing is an effective solution to solve the sedimentation problem. HUBER flushing gates are designed to generate the required flush water volume by impounding the water before opening quickly to free the total sewer cross section and allow the powerful flush water wave to remove the sediments due to its high flow velocity. Sediments in the gate area are also removed due to the formation of a downsurge wave. The special features of the HUBER Power Flush® system:

- Sewer flushing independent of storm events



Flushing gate optimally adjustable to any sewer shape

- Regular flushing using the dry weather flow
- Frameless flushing gate without an invert step
- Possibility of submerging the gates
- Easy retrofitting without any interruption of sewer operation
- Suitable for any sewer cross section
- No additional or special manholes required
- Minimum energy demand

The main component of the system is the flushing gate which is designed and intended even for larger nominal diameters and can normally be installed without the need for structural alterations, without additional installation openings or special manholes, and without any interruption of sewer operation. This new system without an invert step is suitable to be used

for very different sewer shapes and even complex operation conditions and hydraulic requirements. Various designs for different sewer profiles and nominal diameters have well-proven their suitability in practice.

The fully automatic electrical control unit used is tailored to specific local requirements to guarantee maximum system efficiency. Specific operating parameters are defined together with planners and operators and can be changed any time to optimise the process without the need to interrupt system operation.

The HUBER Power Flush® is an economical and ecological solution which maintains the hydraulic capacity of sewers, reduces the frequency of overflow events and thus protects waters. It also prevents other negative effects, such as high peak loads arriving at the wastewater treatment plant and odour annoyance, and minimises energy consumption and costs.



Flushing gate installed in a rectangular storage sewer

HUBER wastewater treatment solution for about 120,000 people

STP Sovetsk – Largest MBR plant in Russia relies on VRM® technology



the plant with its innovative MBR technology will treat the wastewater of about 120,000 residents (26,000 m³/d) in and around Kaliningrad.

Presently Kaliningrad is still uncharted territory as far as wastewater treatment is concerned, there is only one pumping station from old Soviet times. The major part of the waste-

water is discharged to the river Neman without any prior treatment. To meet the high Russian effluent standards one of the most innovative sewage treatment plants in Russia will be built at Kaliningrad in the next two years. As a system supplier for the complete mechanical pre-treatment and filtration equipment,

Two ROTAMAT® Complete Plants Ro 5 270 l/s, one ROTAMAT® Sludge Acceptance Plant Ro 3.1, one COANDA Grit Washer RoSF 4 size 2, and the unbelievable number of 24 HUBER VRM® 30/640 units with in total 92,160 m² membrane surface, these are the key data of the new MBR plant in Sovetsk. Since summer 2011 work has been going on at full speed on site, with the cooperation of our project partner, to erect this most modern municipal sewage treatment plant ever built in Russia. After its completion in 2013



Wastewater pumping station, previous installation



Building site

including additional aggregates and electrical control systems, HUBER has moved up into the league of suppliers for large-scale MBR projects. HUBER has also been commissioned to provide the hydraulic layout of the filtration chambers. Through active

participation in the overall process we take on additional responsibility and provide the customer with additional value in respect of process safety. We will report in detail about this project after completion and start-up.

Continued from page 1: The increasing importance of containerised units worldwide

HUBER BioMem® plants in decentralised applications – installation examples



The HUBER BioMem® filtration unit is a static module consisting of ultrafiltration membrane cassettes in a stainless steel casing. The integrated scouring air system for membrane surface cleaning comes with the necessary connecting fittings. Lifting eyes are provided for easy installation on site. Here is a selection of reference installations:

Beverage factory in Barbados

This is an industrial application of a HUBER BioMem® Compact MBR system with 250 m² total membrane surface on the Caribbean island Barbados, at a small production site of the world-famous Coca Cola company. The hourly throughput is 2.5 to 3.5 m³/h, depending on production capacity utilisation. The plant was put into operation by a HUBER service specialist at the end of November 2010. We

attached special importance to careful briefing of the operating staff on site to ensure the stable plant operation in the long run. The MBR plant has been designed for nitrification as requested by the customer.

The HUBER BioMem® filtration unit is installed in a separate membrane chamber downstream of the bio-tank. As industrial plants frequently have to cope with hydraulic peaks and greatly varying inlet concentrations, the aeration tank is fed from a buffer tank which is big enough to ensure the flow to the plant is constant and continuous throughout the day. Two fixed installed pumps deliver the activated sludge mix into the membrane chamber from where the supernatant liquor flows back into the aeration tank by gravity. The return sludge ratio has been set to 3:1 which is the usual ratio for MBR plants. Plant operation has been stable since start-up and other projects are presently in the execution phase.

Large building development in Greece

The first HUBER BioMem® plant in Greece was installed and put into operation at Marathopolis in September 2010. The plant with 125 m² membrane surface is designed for the wastewater of 150 employees of a nearby hotel. The daily flow to the plant is season-dependent and ranges from 15 to 30 m³. Different operation concepts are applied to meet the requirements of varying flow rates from the building development: In times of low loads the plant is operated as a combination of a SBR plant and downstream filtration unit. With peak flows the plant is operated as a conventional MBR plant with upstream denitrification followed by nitrification and downstream filtration. The operating staff of the neighbour hotel takes care of the MBR plant with VRM® membrane unit including operational checks twice a week.

Washing and cleaning agent industry in Brazil

Another industrial membrane plant with HUBER BioMem® modules for wastewater treatment has been installed in a company in Brazil which produces washing and cleaning agents. Start-up of this 125 m² plant

is scheduled for May 2012. The planned hourly throughput, which is taken as a partial flow from production, is 0.65 m³/h. The average organic BOD5 load is approximately 3,000 mg/l. The wastewater to be treated is pre-screened with a 0.5 mm ROTA-

may be contained within the wastewater flow. In addition, the pH value is corrected in the buffer tank. The wastewater is then pumped into the MBR plant with a DS concentration of 8 g/l and finally treated by the HUBER BioMem® filtration unit with ultrafiltration membranes. The plant operators are happy that they can directly reuse the treated wastewater for cleaning in the production buildings. Membrane technology is the perfect process technology solution for them.

Municipal application in Croatia

The HUBER BioMem® plant is designed for 500 PE and will clarify the wastewater of a small village in Istria, in the north-western part of Croatia - a typical decentralized application. Due to tighter legislation the plant must both achieve high reduction rates related to nitrogen elimination and meet increased hygiene standards. Required and guaranteed energy values must strictly be met and are continuously monitored by local authorities.

The HUBER BioMem® system has well proven its perfect suitability for MBR plant sizes from 100 to 2,500 PE and is used in more and more applications worldwide.



- ① Mounting frame for filtration units
- ② Connection for scouring air to clean the membranes
- ③ Lifting eyes
- ④ Filtration module
- ⑤ Permeate collection pipe
- ⑥ Holders for lateral guide rods

The individual components together make up the filtration unit.



WWTP Barbados

InBev, Planta Sur – Maximum efficiency on a small footprint

Leading global brewer buys its first HUBER MBR plant



With a sales volume of about 400 million hectolitres Anheuser-Busch InBev based in Löwen, Belgium, is the worldwide leading brewery group. The company is one of the five largest producers of consumer goods with about 114,000 employees working for them in more than 23 countries, 2,800 of them in Germany. Their portfolio includes 200 brands in more than 100 countries, among them are the global premium brands Beck's, Stella Artois and Budweiser. With its products Anheuser-Busch InBev is number one or two in 19 key markets worldwide, in more than any other brewery group.

Planta Sur in Barrio Porteño de Pom-

peya in Buenos Aires is their largest production for lemonades, such as Pepsi, 7up, Mirinda, Paso de los Toros and waters of different flavours. A total production of 25,000 hectolitres is achieved with 10 bottling lines, these are 1.1 million units per day.

Increasing wastewater volumes and higher environmental standards forced InBev Planta Sur in 2011 to think about a new wastewater treatment solution. Besides, a part of their premises where their old wastewater treatment plant is installed has been declared a protected nature reserve as it lies very close to a river. They could therefore not build larger additional wastewater treatment systems to handle the high volume of meanwhile 1,440 m³/d but had to use mainly existing tanks.

It soon was clear that membrane technology would be the best available solution to meet environmental standards even on a small footprint. When the biological HUBER system was designed with a higher MLSS of 12 g/l and planning of the associated equipment units was completed it turned out that even the previous aeration tank volume of 1,590 m³ is sufficient and no substantial extensi-

on work was required.

The MBR solution has not only technological but also marketing advantages as InBev Planta Sur as a member in a support program of the Environmental Agency of Buenos Aires show that improved technologies and processes are not only a means to achieve more efficient and economical production but can also protect the environment. We prepared our offer in cooperation with our sales partner Serviur and submitted it to the end customer at the end of April 2011. We offered two VRM® 30 / 480 units, redundant permeate and recirculation pumps, blowers for scouring



The two VRM® 30 / 480 units during installation into the membrane chambers

air and biological treatment and membrane aerators including equipment installation and commissioning. The customer finally placed the order with HUBER and Serviur at the beginning of August 2011.

The total membrane surface of the HUBER system of 5760 m² and its throughput of 60 m³/h provides for a net flux of 11.45 l/m²/h which can temporarily be doubled if service or cleaning work needs to be done. It was a special request of the customer that the VRM® 30 / 480 should be able to filter the total volume flow of 60 m³/h even during plant maintenance. Also the permeate pumps have therefore been designed to ensure 30 to 60 m³/h can be covered.

Another special feature of this project is that it is not possible to feed the

VRM® chamber by gravity due to the low geodetic altitude and wide distance between the VRM® chamber and biological treatment system. The VRM® chamber is therefore fed from the three bio-tanks by means of the customer's pumps and a distribution system. Also the flow from the VRM® chamber to the biological system is returned by pumps. These pumps have been supplied by HUBER.

The plant was installation and commissioned in January and February 2012 and soon achieved the required effluent quality. This project shows that customers rely on our extensive experience in the field of brewery wastewater treatment and adds another outstanding reference installation to our large number of reference projects.

Parameter	Inlet concentration	Outlet concentration (NOMINAL)	Outlet concentration (ACTUAL)	Reduction (ACTUAL)
COD	3750 mg/l	104 mg/l	35 mg/l	> 99.0 %
BOD	1389 mg/l	28 mg/l	5 mg/l	> 99.6 %
TSS	200 mg/l	1 mg/l	0 mg	> 99.9 %

Wacker Chemie AG, Burghausen

Cooling water screening – Pump station Überackern, Austria



Founded in 1914, the Wacker Chemie AG works at Burghausen is the most important production site of Wacker-Chemie and biggest chemical industry location in Bavaria. On more than two square kilometres plant grounds about 10,000 employees manufacture some thousand different products in about 150 production plants. The Burghausen site is located 110 km east of Munich near the Austrian border, in the Bavarian Chemical Triangle. Several pump stations extract almost the total cooling water required from the nearby river Salzach and the Alz Canal.

The low pressure pump station Überackern on the Austrian side was built

in the fifties. It is operated by WACKER Germany and delivers cooling water from the river Mühlbach to their Burghausen site. Previously, three treatment lines were installed there, each consisting of a coarse screen (40 mm wire rope type screen) and fine bar screen (2 mm travelling chain screen) for water treatment. As too much silt passed through the two screen stages especially in autumn, the coarse screens were replaced by 15 mm telescope type unit at the beginning of 2010.

Recently, also the fine screens were replaced by HUBER perforated plate screens with 3 mm aperture to further improve the situation and achieve



Wacker Chemie AG, Burghausen



Fine screen system before replacement work

an increased retention of pollutants with the result of reduced cleaning requirements for the downstream heat exchangers. Due to the positive experience with HUBER machines over many years, the customer relied on us and ordered three HUBER EscaMax® screens, size 7000 / 1752 / 3 mm.

Since June 2010, these screens have reliably extracted water from the river Mühlbach. Previously, the scree-

nings separated from the river water were discharged to a trough behind the fine screen and removed manually. This step has been automated with the installation of two HUBER ROTAMAT®-Screw Conveyor Ro 8t units for the removal of max. 3 m³/h screenings and their transport over about 17 metres.

The treatment of river / surface water for process / cooling / drinking water production requires sturdy and reliable screens. HUBER screens of the MAX and STEP SCREEN® family have well proven in similar projects and are successfully applied by renowned

industrial concerns, such as Wacker, BASF, InfraServ, Thyssen Krupp, SASOL, SSAB, RWE, Bayer, etc.

Screens installed:

- 3 HUBER EscaMax® screens, size 7000 / 1752 / 3 mm
- Maximum throughput per screen: 2,200 m³/h
- Screenings transport: 2 HUBER ROTAMAT® Screw Conveyors Ro 8t
- Screenings transport capacity: 3 m³/h



Automated screenings removal



3 HUBER EscaMax® screens, size 7000 / 1752 / 3 mm

Continued from page 1: HUBER are proud to announce the launch of a new range of innovative MBR systems

smart MBR® - The new generation of water recycling systems for buildings

install and operate, whilst maintaining the high build quality and technical standards for which HUBER is known.

The smartMBR systems come in 6 standard sizes, ranging in daily treatment capacity from 10m³/day to 75m³/day. They can treat conventional wastewater to produce clean, odour free and safe recycled water. This can then be used (subject to local regulations) for non-drinking uses such as irrigation, toilet flushing, cooling tower make-up and water features. Whilst the distinctive clean design is already setting a new industry standard in visual appearance, this can be further enhanced by the use of graphics to enable a customer to decorate the units to their requirements. This allows customers to visually blend the units into the background if they wish, however it equally allows customers to promote their efforts in sustainable operations or put the clean area on the side of the unit to use by displaying signage or site maps etc.

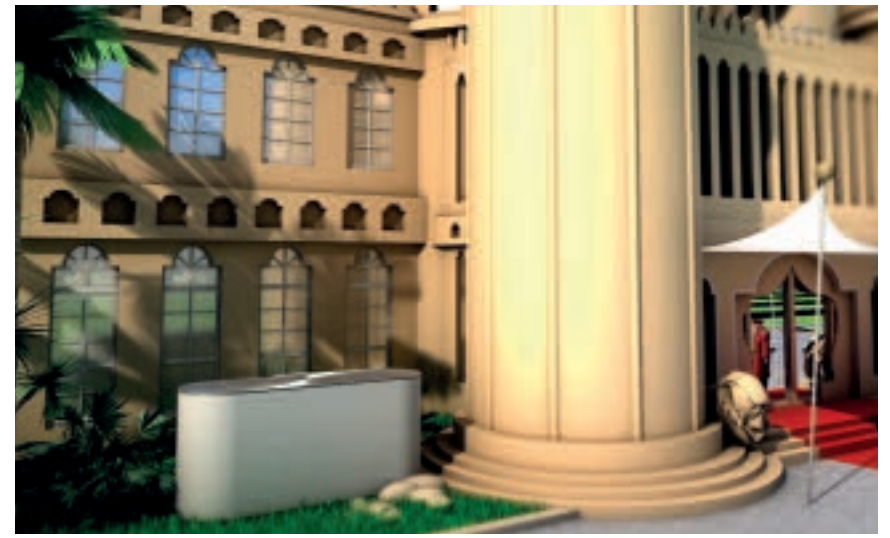
"We are very excited about the launch of this product range" says HUBER CEO Georg Huber. "Many cities are already running out of water, and this situation will get much worse in the coming years. The smartMBR range provides a user friendly and visually attractive solution. These features are important to city dwellers. It also allows the implementation of water recycling on a step by step basis, which the reality of financial and practical constraints requires."

Technical Details:

The units are of full stainless steel construction to ensure they are strong enough to cope with the bumps of transportation, and a long operating life. All components and electrical cabling are pre-installed at our factory. The side mounted ancillaries unit is located inside the tank for safety during transport. Once the smartMBR is on site, the ancillaries unit is simply removed from inside the tank, and fixed onto the side of the tank with 4 bolts. Services connections are quickly and easily made via twist lock connectors or multi-pin electrical connectors and unit is ready to go within about 1 hour.

When routine cleaning of the membranes is required, this has been made as clean and easy as possible for the service personnel. The membrane unit has been designed so the lifting points and the mounting brackets are all raised up above the activated sludge level. An optional portable gantry crane will also be offered with the units to allow lifting out of the membrane units for routine cleaning.

The smartMBR range will be formally launched at IFAT Entsorga 2012 which takes place in Munich during May.



Hotel entrance



Examples of smartMBR units decorated with graphics

HUBER are proud to announce the launch of a new range of innovative MBR systems to provide recycled water solutions for large buildings within the worlds ever growing cities. They are intended for use in hotels, shopping malls, apartment buildings etc, and so the smartMBR systems have been carefully designed so they are attractive looking and simple to



Typical hotel installation

HUBER MBR solution for 5-star luxury hotel

Wastewater treatment solution for five-star hotel Xanadu Island

Xanadu Island

In December 2010 HUBER SE received the order to supply a MBR plant including a preliminary screen for the Xanadu Island Resort. The Xanadu Island resort is a prestigious and exclusive five-star all suite hotel at

the west coast of Turkey. It is situated on a private peninsula, amidst beautiful gardens and flowered courtyards and surrounded by the deep blue water of the Aegean Sea. This enchanting and elegant resort

belongs to the famous Xanadu chain offering an All Inclusive concept with High Class service.

This project has posed new challenges to us: The plant had to fit into an existing building and a narrow time frame had to be observed. The customer wanted to have the work completed before the start of the summer holiday season in May this year. To make sure our proposal would optimally meet the customer's requirements we had to find out about his specific needs, so we travelled to Turkey still in December and discussed the project with the customer together with our Turkish sales representative and representatives of the planning office BYOSIS from Ankara.

This early meeting has greatly facilitated the further execution of the project because we learned a lot of useful facts and could take these into account in our project planning right from the beginning. HUBER supplied the first two VRM® 20/300 units in April 2011, these were immediately built into the new filtration chambers which have been integrated in the basement of the operational building. Two weeks after the first delivery the next two VRM® 20/300 plants and two ROTAMAT® Micro Strainer Ro9 E 300/3 units for wastewater pre-screening arrived at the hotel. Also these ultra-filtration plants and screens were installed immediately after delivery. The biological treatment system including the complete pipework was



The core component of the HUBER VRM® 20/300 dangling over the Aegean Sea

built at the same time. During this phase HUBER was in constant contact with the planning office and the responsible representatives of the Turkish hotel owner AGRON Turizm. The close contact made it easy and uncomplicated to get quick decisions.

Plant commissioning took place immediately after completed installation. Both installation and commissioning were executed by our experienced fitters and start-up engineers. They also explained to the hotel staff how to operate the plant. The plant could be put into operation in time for the new holiday season. At first, during the low season, only three of the VRM® 20/300 units were operated. Now as the occupancy rate has increased all four units are in operation and treat 1,200 m³ hotel wastewater

per day. The treated water can be used as high-quality process water. Due to the good cooperation between HUBER and the plant operators the optimal plant performance has been achieved already during the run-in phase and could be maintained in later routine operation.

Effluent values meet the expectations and requirements of a five-star hotel. The hotel operators use the treated wastewater to irrigate lawns and palm groves around the hotel. With its product portfolio HUBER SE is perfectly prepared to meet the requirements of tourism industries as well as the regulations of authorities, especially in areas with very little precipitation but a high water demand or with a nature that is worth protection.



The pool area of the Xandada Island resort

Saniresch project

Innovative HUBER MBR system for wastewater treatment

Eschborn

Under the SANIRESCH project, supported by the Federal Ministry for Education and Research (BMBF), the wastewater treatment solution installed at the headquarters of the German Society for International Cooperation (GIZ) in Eschborn collects individual wastewater flows separately. Due to the very high clarification efficiency of the innovative HUBER MBR system used to treat the greywater, the high-quality effluent can be used for irrigation or toilet flushing. The HUBER MBR system uses membrane ultrafiltration membranes with 38 nm separation size.



Picture 1: GIZ headquarters at Eschborn

The comprehensive renovation of the GIZ headquarters in Eschborn carried out from 2004 to 2006 included a concept for the separate collection of the different wastewater flows in house no. 1 (GIZ headquarters, pic. 1). Under the SANIRESCH project (SANitaryRecyclingESchborn) HUBER supplies, among others, the wastewater treatment plants for the production of service water from greywater. Due to its innovative character the project is supported by the Federal Ministry for Education and Research (BMBF) (funding no. 02WD0952). The wastewater flows from kitchens, wash hand basins and wash water sinks in the GIZ building (wash water without faeces) are collected separately and treated in a mechanical pre-treatment unit and the innovative MBR system. 38 washing and wash hand basins and 8 dish washing machines are connected to the greywater line, with a volume of 350 l greywater to be treated per day. The following modular components are installed (MBR greywater treatment plant, pic. 2):

- Aerated Intermediate storage tank with preceding screen (3 mm mesh)
- Membrane Bioreactor with submerged HUBER ultrafiltration module in a plastic tank
- Permeate / service water storage tank
- Electric measuring and automatic control devices including remote data transmission (incl. fault indication via SMS) and telecontrol

The mechanical pre-treatment unit, a 3 mm screening element, removes coarse material (hairs for example) prior to the MBR treatment process. The pre-screened wastewater is immediately stored in a tank from where it is pumped batchwise into the

membrane bioreactor. An ultrafiltration module with 38 nm separation size is used for filtration in the MBR tank. Via a pump the permeate is sucked off through the membranes with some underpressure (approx. 60 mbar) and stored in a tank to be used as service water. Continuous introduction of scouring air below the membrane modules prevents clogging of the membrane surface.

The plastic tanks are customized units perfectly tailored to meet specific customer requirements, and they are odour-tight. To ensure as problem-free as possible plant operation, for the first time a telecontrol sys-



Picture 2: MBR greywater treatment plant

tem is used in addition to the normal remote data transmission including fault messages via SMS. Operation statuses can be read from a remote central station and parameters adapted accordingly if necessary. This reduces potential standstill times and service requirements to a minimum.



Picture 3: Membrane ultrafiltration unit

All operating data are recorded on the data logger and can be read via remote transmission if required. This allows for exact operation control and early identification of trends, an increase in transmembrane pressure for example.

First test results have shown a high cleaning efficiency and proven the stable operation of the plant. Average COD elimination is presently 95%. The membrane ultrafiltration unit reliably retains solids, bacteria and virtually all viruses (membrane ultrafiltration unit, pic. 3). The produced permeate meets the microbiological EC quality standards for bathing waters. Due to its excellent quality the permeate can be used for toilet flushing and irrigation. This improves the water efficiency of buildings.

If they can prove a sustainable practice in water use, they can obtain environmental certificates as proof of the value added to their buildings. The interest of banks, investors and users of especially water-efficient buildings



is increasing worldwide, particularly in arid regions such as the United Arab Emirates. With certified buildings property owners benefit from an improved image and low operation costs in addition to the consequent sustainability they achieve.

Additional information about the project is provided on www.saniresch.de and www.facebook.de/saniresch.

Project Data

Technical Data:

- Bio-system volume: maximum 0.5 m³
- Membrane surface: 3.5 m²
- Separation size: 38 nm
- Membrane material: PES

Operating parameters:

- Flow rate: 350 l/d
- DS content: 3 - 6 g/l
- BDS ≤ 0.1 kg COD/(kg DS*d)

Hotel Fuchsbräu at Beilngries, Germany uses recycled greywater for toilet flushing

The idea of sustainability

Beilngries

The town Beilngries with a population of about 8,750 is a touristic centre in the middle of the nature park Altmühltal in Bavaria. The historic town has region-wide water supply and wastewater disposal systems according to German standards. Drinking water of excellent quality is always available in this region. The specific water consumption of private households in the municipality ranges

around the German average consumption, which is a rather low level. Especially tourism industry attaches great importance to the idea of sustainability with the use of water because they have an economic benefit from saving water. The innovations applied in the tourism branch not only on the energy sector but also for water use can serve as example solutions for densely populated areas.

Greywater recycling with HUBER MCB

The four-star hotel Fuchsbräu in Beilngries with indoor swimming pool, sauna and seminar house (pic. 6) has already won several awards. When they modernised their hotel from 2008 to 2010, especially the lis-

ted historical seminar house, they built in the most advanced home automation for energy and water/wastewater. Warm water is delivered by a solar energy plant and they use geothermal heat and also heat recovered from exhaust air. In addition, greywater is recycled internally.

The wastewater from the wash hand basins and showers in the hotel rooms (20 of in total 75) is collected via a separate pipeline system. The collected greywater is passed to biological treatment followed by membrane filtration. The MBR plant installed in the basement of the hotel building consists of several components which have been tailored to meet the hotel's specific requirements:

Parameter	Berliner Merkblatt ¹⁾ (limit values of RL 76/160/EWG) ²⁾	Service water/ MBR effluent (Hotel Fuchsbräu)
BOD	< 5 mg/l (-)	< 4 mg/l
Oxygen saturation	> 50% (80-120%)	> 100%
Total coliforms	< 100/ml (100)	< 1/ml
E-Coli	-	n.n. below limits of detection
Pseudomonas aeruginosa	< 1/ml (-)	n.n. below limits of detection

Quality standards for toilet flushing water and permeate quality (random samples taken during the test period October and November 2011, hotel Fuchsbräu, Beilngries, Germany)

¹⁾ Berliner Merkblatt, 1995 ²⁾ Limit values for bathing waters according to RL 76/160/EWG



HUBER greywater recycling plant installed in the basement of the hotel, and technical data



Four-star hotel Fuchsbräu in Beilngries, Germany (Fuchsbräu 2011)

- Aerated intermediate storage tank with preceding HUBER screen (3 mm mesh)
- Membrane bioreactor with submerged HUBER ultrafiltration unit (type MCB 3 with 21 m² membrane surface)
- Storage tank with automatic drinking water feeding
- Electric measuring and automatic control devices including fault indication via SMS

The quality of the treated greywater meets the microbiological requirements of the EC standards for bathing waters RL 76/160/EWG (1975). As the permeate is free of particles and odourless it meets the high aesthetic quality expected by hotel guests and owners. The quality standards for toilet flushing water and the permeate quality achieved

during the test period in October and November 2011 are presented in table 1.

Since the beginning of 2011 the treated greywater is fed into the service water network and used as toilet flushing water in the hotel rooms. Consequent use of the high-quality service water for hotel operations sustainably reduces drinking water consumption.

Technical Data:

- Aeration tank volume: maximum 1.500 l
- Filtration unit: 1 x MCB 3
- Membranfläche: 10,5 m²

Operating parameters:

- Flow rate: 750-1.960 l/d
- Dry substance: 5 g/l
- BDS ≤ 0.1 kg COD/(kg DS *d)

Hygienic high-quality drinking water for consumers

Protection of drinking water, our most important resource



out by gravel filters. Further treatment is not necessary. The water is delivered to the supply network via reservoirs as and when required. Customers are at any time supplied with the amount of water they need. About 12 million litres of drinking water a day flow through the 756 kilometres long network to the connected households.

In cooperation with Bielfeldt Metallbau GmbH in Ahrensburg and HUBER SE, Vereinigte Stadtwerke GmbH have planned, dimensioned and installed a HUBER Air Filter Plant L361. A respiration process results from the varying water levels in the clear water reservoir for which reservoir aeration and deaeration is required.

Drinking water in Germany must meet the high quality requirements of the German Drinking Water Ordinance which specifies the permissible limits for the substances contained within water. The four water works in the supply area of the municipal utility Vereinigte Stadtwerke GmbH supply hygienic high-quality drinking water to their customers. The water quality is regularly controlled by an independent laboratory in coordination with the local health authorities.

The water comes exclusively from natural groundwater resources and is treated to drinking water quality in the four water works. Oxygenation is applied to oxidise the iron and manganese naturally contained in the soil. The generated flocks are filtered

The ambient air contains a number of particles and contaminants from natural processes, such as erosion or decomposition of organisms, and from human activities, such as agriculture or industry. Dust and various organisms (spores, pollen, fungi, etc.) may enter the drinking water reservoir via the respiration process. During reservoir operation all these particles would settle on the wall, ceiling and water surface. Due to condensation of water on the tank walls they would be a danger for water quality. German DVGW standards therefore demand that the openings for tank ventilation must be protected with screens and equipped

with filters [DVGW worksheet W 300, Bonn, June 2005]. To make sure the required drinking water quality can still be guaranteed, Vereinigte Stadtwerke GmbH decided to replace their old technical equipment.

Together with HUBER and Bielfeldt Metallbau GmbH a solution has been developed which ensures the reliable removal of small, unhygienic particles: a filter for suspended matter with preceding fine dust filter to increase the life of the filter cell.

To eliminate damage to the structure caused by high overpressure or underpressure, the plant has been designed for 400 Pa maximum pressure difference and a safety valve has been integrated in the air line. Due to scarce space and to meet the customer's request for an attack-proof, lockable, side-hinged louvre, we have developed a special solution together with the operators.

The air filter plant and air line, including the connection plates and louvres, have been designed to ensure that aeration and deaeration is achieved with one plant for both reservoir chambers. The customer still has the option to install a second air filter plant later without the need for much structural alteration.

The future-proof investment guarantees the supply of hygienic drinking water for all consumers also in the future.



Special solutions have been developed due to space constraints



Air line with safety valve

Competent service for optimal plant operation and operating costs

HUBER Global Service



HUBER Spare Parts Service

Our service team in Germany is available with advice and support in the selection of the best original spares or wear parts for your machine. A large stock holding guarantees high availability of essential spare parts for your HUBER products.

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 Maintenance Service

Preventive maintenance is without doubt more economical than reactive maintenance. We offer customised service packages to ensure maximum performance is achieved in terms of operating reliability and costs.

HUBER Product Optimisation Service

Optimally customised machines guarantee a constantly 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 could be achieved through equipment optimisation. We provide and guarantee this service with our HUBER product optimisation service.

HUBER Teleservice

"You cannot see us but we are with you and your machines." 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. This guarantees maximum safety and operation efficiency.

HUBER Service for products from other manufacturers

We offer an extensive and professional service for products from other manufacturers, comprising spares, repair and equipment optimisation. One contact person for all service requests - a clear logistic and economical benefit for our customers!

Global HUBER Consultancy Service

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.

our qualified service technicians.

HUBER Training Service

A well-briefed operating staff is a prerequisite 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 HUBER service centre in Berching.

Service makes the difference

We offer an extensive product-accompanying service for all your HUBER machines and plants during their product life cycle.

Don't hesitate to contact us!

Service packages are available to meet any budget and we provide a tailored solution for every individual customer to guarantee maximum operating reliability and minimised operation costs in the long run!

Superior technology systems require optimal operation if you want to make use of all economic advantages in the long run and to the full extent. HUBER Service provides support in product operation with a comprehensive package of services to ensure the customer gets back the expected return on investment: maximum performance and plant availability at minimum operating costs.

HUBER Installation and Commissioning Service

Rely on our qualified service staff for installation and commissioning! Their expertise and extensive know-how ensures the best start for your new HUBER machine.



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