

Planning reliability
for operation and costs

Municipal wastewater treatment
plants – Mall-System



Wastewater treatment technique

Mall SBR plant for 750 PE, onsite wastewater treatment plant, Mellenthin



Starting situation

In Mellenthin on the Baltic Sea island of Usedom, a wastewater treatment plant with a fixed bed was until recently in use, which in a multiple chamber septic tank was unable, or insufficiently able, to treat the wastewater produced. The aim was to put the old wastewater clarification plant out of use and to connect households to a modern wastewater treatment system.

In winter, the average load is 450 PE; during the summer months, however, the new wastewater treatment plant at Mellenthin would have to be able to cope with 750 PE due to the tourist trade and gastronomy business. Increased wastewater purification standards applied due to the direct proximity to a nature reserve.

Solution

SBR systems have proved their worth many times in similar conditions, and provide reliable wastewater treatment capacity even with fluctuating loads such as those anticipated in this case due to the alternating numbers of tourists. The plant in Mellenthin was realised as a single line system with high buffer, SBR and sludge storage volumes, in order to enable stable nitrogen and phosphate elimination despite seasonally fluctuating inlet loads.

Project data

Type of system: 750 PE single-path, activated sludge system with sequencing batch reactor with:

- DN 1200 IDM shaft
- Screen/sand trap/grease trap combination system
- Inlet pump system / DN 5600 balancing tank
- DN 1600 coagulant metering station
- DN 9000 SB reactor (in-situ concrete)
- DN 5600 outlet throttle shaft
- DN 9000 sludge tank
- DN 1200 sample-removal manhole
- Compressor and operating building
- Fan station

Client: Usedom waste management association, Ückeritz

Operator: Usedom waste management association, Ückeritz

Planning: Wegener & Hinz GmbH, Neverin

Construction: Mall GmbH, Coswig

Year of construction: 2008

Treatment goal as per the AbwV (German Waste Water Ordinance) and effluent values achieved in mg/l (sampled over a period from 07/01/ to 30/04/2009, averaged)

Parameter	Treatment goal	Effluent values
COD	150	54
BOD ₅	40	8,6
NH ₄ -N	10	0,4
N _{total}	25	2,9
P _{total}	10	6,3

Mall SBR plant for 300 PE, municipal wastewater treatment plant at Winkeln

Starting situation

The community of Schalksmühle intends to construct a wastewater treatment plant for its Winkeln district with a total capacity rating of 300 PE. In the process, the community was drained entirely by a separate sewerage system. Following commissioning and trial operation of the plant, Ruhrverband ZN Hagen took charge of technical operations. To keep cost on site to a minimum, the plant is equipped with appropriate remote control systems.

Solution

As part of the draft design and approval planning process, an SBR-system was chosen for waste water cleaning. In the bid tendering process, the offer of Mall was found to be the least expensive. The waste water is flowing through a pressure pipe-line into the presedimentation tank and after this into the buffer. From here, the SBR filled in a discontinuous process. A high level of flexibility is achieved through automatic adaptation of plant control system to changes in infeed conditions. Presedimentation, buffer, SBR reactor, sludge tank and management building were all constructed from pre-fabricated reinforced concrete. All process data and fault messages are communicated via the ACCRON CONNECT system to the control room at the Breckerfeld wastewater treatment plant, also operated by the Ruhrverband.

Project data

Type of system:
Mall-SBR-wastewater treatment plant for 300 PE separating system with:

- Presedimentation DN 2500
- Buffer DN 3000
- SBR DN 5600
- Sludge tank DN 3000
- Management building for blower and control board

Purification target:	Denitrification and Bio-P elimination
Client:	Municipality of Schalksmühle
Planning:	Mall GmbH
Tank construction:	Mall GmbH, Coswig
Technical equipment:	Mall GmbH, Coswig
E-MSR technology:	H & F Industry Data GmbH
Construction period:	December 2006 to June 2007



Mall SBR plant for 200 PE, AGROFARM country butcher, Knau



Starting situation

The agricultural company AGROFARM Knau e.G. manages a useful area of 1,800 hectares and employs 91 people. The company planned a wastewater treatment plant to handle the wastewater produced by its country butcher's shop. Wastewater from meat production operations differs significantly in content from municipal wastewater; usually, it is characterised by significant levels of COD, BOD₅, fats and solids. Furthermore, the large amount of wastewater must in most cases also be restricted before being fed into the receiving waters.

Solution

In order to treat the wastewater from the AGROFARM Knau country butcher's shop, the required purification performance is achieved using an SBR plant with upstream sludge trap (3,000 l capacity) and grease separator (800 l grease storage capacity). The wastewater is purified using activated sludge technology in the reinforced concrete tank of the SBR reactor. From the reactor, the purified wastewater is fed via a free gradient into the sample-removal manhole with regulating gate valve, where it is restricted to 1.5 l/s and then fed into the Drebabach stream, which is located close by.

Project data

Type of system: 200 PE single path, activated sludge system with:

- DN 2000 sludge trap
- DN 2000 grease separator of type NEUTRAsept, with sample-removal manhole
- DN 2500 primary sedimentation tank
- DN 3000 balancing tank
- DN 5600 SB reactor with pipe ventilation
- DN 2500 sludge tank
- Sample-removal manhole with regulating gate valve
- Aggregate concrete cabinet for the plant control system and the compressor
- Metering station for phosphate coagulant

Client: AGROFARM Knau e.G.
 Operator: AGROFARM Knau e.G.
 Design: Ingenieurbüro Katholing, Bindlach
 Specialist engineer: Dipl.Ing. (FH) G. Nürnberger, Mülsen
 Construction: Mall GmbH, Coswig
 Year of construction: 2006/2009

Influent and effluent values in mg/l
 (sampled over a period from 14/11/2007 to 30/11/2009, averaged)

Parameter	Influent	Effluent
COD	2149	83
BOD ₅	1180	9
NH ₄ -N	119,03	3,41
N _{total}	143,8	13,81

Mall SBR system for 600 PE, wastewater treatment plant for municipality of Bechstedt-Wagd

Starting situation

The municipality of Bechstedt-Wagd, comprising the districts of Altdorf and Neudorf and an area of weekend residential sites, intended in 2005 to construct a wastewater treatment plant for all 3 of these areas. In this process, Neudorf and the weekend sites are to have separate sewerage systems while Altdorf is to be drained by a combined sewerage system. Connecting these up to the wastewater treatment plant will take place in two construction phases.

Solution

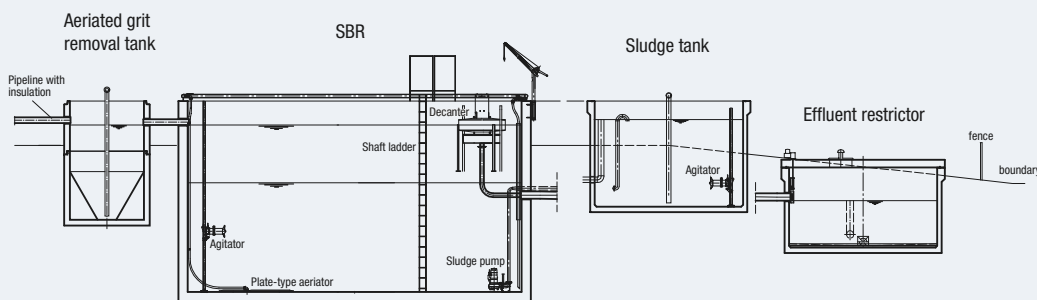
The assignment requirements were met by planning and constructing an SBR system. A high level of flexibility is achieved through automatic adaptation of the plant control system to seasonally changing infeed conditions. The use of RMU aeration systems reduces the amount of energy required by up to 30 %.

Project data

Type of system:
Mall SBR system for 300/600 PE
by a wastewater treatment plant
for combined system:

- Buffer DN 4000
- Screening compactor
- Aeriated grit removal tank
- SBR DN 9000
- Sludge tank DN 4000
- Effluent restrictor DN 4000
- Management building

Purification target: Denitrification and Bio-P elimination
Client: WAZV Arnstadt
Planning: Mall GmbH
Tank construction: Mall GmbH
Technical equipment: Mall GmbH
Construction period: June to October 2005



Mall trickling filter system for 155 PE, Onsite wastewater treatment plant, Brünkendorf



Starting situation

The community of Brünkendorf is located directly on the geographical border between Mecklenburg and Western-Pomerania, only a few kilometres from the beaches of the Baltic Sea. An onsite wastewater treatment plant for treating domestic wastewater with a capacity of 155 PE was planned for construction in 2006.

Solution

An above-ground trickling filter system was chosen for the wastewater treatment. This reliable, energy-saving process allows stable reduction of C-carriers (COD / BOD) with low levels of sludge production. Wastewater from the buffer tank is fed to the rotary sprinklers and then distributed evenly over the trickling filter material. This filter is composed of hanging plastic fabric containing sessile organisms. The hanging arrangement ensures intensive contact between the biomass and the wastewater and also controls the wastewater treatment without the need for additional artificial ventilation.

Project data

Type of system: 155 PE single-path MTK trickling filter wastewater treatment plant of type VariKom with:

- Preliminary treatment / DN 3000 Dortmund tank
- DN 2500 balancing tank
- DN 3000 trickling filter with SESSIL® filling material
- DN 1500 recirculation shaft
- DN 3000 post-treatment
- Outlet pumps / DN 1500 sample-removal manhole
- DN 1500 electromagnetic flowmeter shaft
- DN 3000 sludge tank
- Aggregate concrete cabinet for the compressor, transducer and the plant control system

Client: Tief-, Straßen- und Kulturbau GmbH, Dettmannsdorf-Kölsow
 Operator: Boddenland GmbH
 Planning: Ingenieurbüro Voss & Mudrack; Marlow
 Construction: Mall GmbH, Coswig
 Year of construction: 2006

Mall trickling filter system for 150 PE, communal wastewater treatment plant, Epauvillers (CH)

Starting situation

The district authority had to install a wastewater treatment plant. Since the existing canalisation was partly built as a combined system, the flow to the plant had to be slowed down, whereby the plant design also had to enable partial mechanical cleaning of the rainwater.

Solution

These conditions have been met using a Mall VariKom trickling filter system with an upstream automatic screen system and storage basin for controlled feeding of the plant. The closed construction system also enabled the entire plant to be built underground.

Project data

Type of system: Mall VariKom
220 PE trickling filter system with:

- Screen system in operating building
- DN 4000 storage basin
- Preliminary treatment via a Dortmund tank
- DN 1500 feed-PW
- DN 4000 trickling filter
- Transfer shaft
- DN 3000 post-treatment

Client: Epauvillers Community Authority
Planning: Mall GmbH
Delivery: Mall GmbH
Installation: Mall GmbH
Year of construction: autumn 2004

The advantages at a glance

- Stable operation over a range of different influent conditions
- Low energy consumption
- Installed completely underground





Municipal wastewater treatment plants – further references

Mall sets quality standards. And has been doing so for decades.

With its extensive range of environmental and climate protection products, the Mall group has become one of the most important specialist providers over the last five decades, offering process-engineering expertise in the fields of separation technology, rainwater management, wastewater treatment, new energies and pump and plant engineering.

With continuous dialogue and expertise transfer, we have combined concrete technology and environmental processes to create integrated solutions and systems.

Mall is one of the market leaders in rainwater and separation technology and, with 5 production facilities, has a Germany-wide presence in the construction material trade.

Mall has additional subsidiaries in Switzerland, France, Poland and Hungary.

Our core areas of competence

- Rainwater management
- Separators
- Recycling of washing water
- Wastewater treatment plants
- New energies
- Manhole and container construction
- Pump and plant engineering
- Grey water utilisation

Services

- Consultation
- Project planning
- Installation drawings
- Installation with leak test
- Maintenance and service

See www.mall.info for project reports.

Other references

clients	country	location	plant capacity
Motorway service station	France	27310 Shell Aire de Bosgouet	250 PE
Motorway service station	France	77116 Achères La Forêt	600 PE
Municipality	France	67510 Wingen	600 PE
Motorway service station	Italy	Tamoil A 21 Torino - Brescia Ghedi ovest	250 PE
Municipality	Switzerland	02885 Epauvillers	220 PE
Motorway service station	Spain	AGIP Alsasua	200 PE

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