The so-called “batch technology” represents a particularly interesting and effective operating method for wastewater treatment plants, and such plants are known as SBR plants (Sequencing Batch Reactor). This process has a long tradition, and was taken up again by BIOGEST in the middle of the 1980s. Now that it has been adapted to modern technology, this operating mode is an inherent part of the market range for biological wastewater treatment plants. A changeover from flow-through to damming principles is taking place now-a-days and realised in the SBR process. Combination of the “activation” and “clarification” stages in one tank reaction is a characteristic of this. The SBR process offers high process flexibility, is not sensitive to hydraulic shock loading, reliably eliminates nutrients, and also separates sludge and water perfectly. On top of this, the process results in extremely compact construction and therefore minimisation of the investment costs. Thanks to the flexible plant geometry (tanks with circular, rectangular or square floor plans), SBR wastewater treatment plants from BIOGEST can also be implemented without problems in difficult construction conditions (tourism areas, leisure facilities, high-rise buildings, etc.). In addition, plants which work using the SBR process can be extended using modules and also allow a wide range of operating strategies.
BIOGEST®-sequencing batch reactor systems (SBR) offer many advantages over conventional flow-through activated sludge systems, which may incorporate separate flow equalization, aeration final clarifier basins and return sludge pumping station. The advantages are as follows:

**Lower installation costs**
Each SBR- Reactor operates as an aeration basin and final clarifier and provides the equivalent of flow equalization. This eliminates the need for separate structures for each unit process: The use of fewer structures in the treatment system generally results in lower construction and installation costs. Based upon comparisons the installation of an SBR represents 10% - 20% costs savings (for example compared to an oxidation ditch treatment system designed and equipped according to identical effluent quality).

**Smaller footprint**
In consequence of the combination if the aeration and sedimentation process in only one tank a SBR-reactor requires a smaller footprint than a conventional wastewater treatment system. So a footprint reduction of approx. 10% and a volume reducing of 30% is achievable.

**Consistent effluent quality**
The tradition of the “One Tank Reactor” goes back to 1960, when the first SBR-plant was realized in Switzerland by our local partner. Meanwhile, hundreds of SBR-plants are in operation as well in Germany as world-wide. The connection loads range between 100 and 50,000 population equivalents. Different types of SBR-plants are belonging to our references: Single stage units, double stage units, multiple stage units, covered systems, uncovered systems, plants for domestic sewage, plants for industrial sewage etc. The main reason for the consistent effluent quality is the usage of the so-called **CROWN-decanting system**, developed by BIOGEST especially for the operation in SBR-wastewater treatment plants. The CROWN-decanting system represents the actually mostly safe concept for a clearwater discharge free of any floated or aerated sludge!

**Easily tolerates variable loads**
The BIOGEST®-SBR easily tolerates variable hydraulic and organic loads since the SBR-Reactor serves as its own equalization basin. Mixed liquor solids cannot be washed out by hydraulic surges since effluent

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**The SBR Process - Treatment Cycle**

1. **Cycle start**
2. **Aeration & mixing**
3. **Fill-up-phase**
4. **Sedimentation**
5. **Clearwater decanting**
6. **Clarification-phase**
withdrawal is typically accomplished in a separate phase following the termination of flow to each reactor. In relation to this advantage of a SBR-Reactor a conventional wastewater-treatment plant does not have the possibility to compensate hydraulic peak loads and so the sewage can leave the clarification tank without the necessary grade of purification during a peak load phase.

**Ideal undisturbed settling**

Since there is no flow to the reactor during settling and no mechanical sludge collection device ‘stirring’ the basin, ideal settling conditions are guaranteed: That is not the fact in conventional wastewater treatment plants, where hydraulic peak loads can disturb the sedimentation process. In this case sludge can leave the clarification tank.

**Less sludge production**

Sludge production from an SBR is in most applications less than in a conventional activated sludge system. A SBR-plant will typically produce settled sludge concentrations of 1\% or more. Normally the amount of sludge in a conventional wastewater treatment plant is approx. 20\% higher than in a SBR-Reactor. Consequently the costs, for the sludge treatment (dewatering, transport etc.) can be minimized.

**High reliability**

Further more the exclusive using of stainless steel construction (surface aerator, clearwater decanting system, pipes etc.) ensures a trouble-free operation for 20-30 years. So the reliability of the whole plant can be maximized and the maintenance effort can be reduced considerably.
CROWN® clarified water decanter

Type DK/W

The CROWN decanting system was developed by BIOGEST AG with the aim of providing operationally reliable clarified water extraction in SBR wastewater treatment plants or damming plants. This system stands out since it extracts clarified water without floating and activated sludge while consuming almost no energy.

The CROWN decanting system is especially suitable for clarified water extraction from SBR reactors, for solids-free extraction during the clarified water phase in drinking water treatment plants, and also for sludge liquor extraction from sludge storage tanks.

CROWN® decanter

Type LF

The CROWN Type LF decanter was specially developed for process control task definitions requiring the extraction of low-density liquids out of retention tanks. For this reason the CROWN Type LF decanter is, for example, suitable for light liquid extraction from surface water collection basins (road drainage, airport runway drainage etc), sludge liquor extraction from sludge storage tanks, or for predominantly sludge-free clarified water extraction from storage basins.

BIOGEST CROWN® decanter systems have following advantages:

- decades of service life
- high operational reliability
- low maintenance costs

Puritainer

With the Puritainer, BIOGEST has developed an effective "ready-to-connect" compact wastewater treatment plant which purifies wastewater using the SBR process. Thanks to the use of system components, delivery at short notice for urgent applications is possible. The container construction method simplifies transport and the system is ready for direct connection on site (thanks to complete pre-assembly in the works). The PURITAINER is extremely reliable and simple to operate thanks to the use of established plant technology.

Operation is completely automatic and offers a permanently high purification performance. PURITAINER sewage treatment works can be manufactured in different graded system sizes so that they can be used for loading values of up to around 250 PE. It is also easy to extend the plant thanks to its modular arrangement.

Application possibilities

PURITAINER wastewater treatment plant can be used anywhere where domestic wastewater is to be biologically purified. Ideal application cases are camps, housing estates, hotels, restaurants, hospitals and sanatoriums, barracks, campsites and holiday villages. The well-engineered PURITAINER wastewater treatment plant design ensures that the purification performance is high enough for the purified wastewater to be discharged into rivers, lakes or other waterways without problems despite the often unfavourable operating conditions associated with smaller connected loads. The wastewater purified in the PURITAINER can, of course, also be usefully reused, for example in the irrigation of green areas, for concrete manufacturer or additions to cooling water. This is an interesting economic aspect, especially in countries with limited water reserves. In such cases, the PURITAINER wastewater treatment plant can be supplemented with a disinfection stage if necessary.
**Construction**

PURITAINER wastewater treatment plants from BIOGEST are always manufactured as steel construction protected against corrosion. This robust material has proven itself in more than 200 applications. The decisive benefits in this case are simple implementation of repairs and the low weight in comparison with concrete. Furthermore, corrosion protection is given high priority in all PURITAINER wastewater treatment plant: after thorough sandblasting, all steel components are coated with a paint specially developed for hydraulic steel structures. The PURITAINER sewage treatment design is based on the many years of experience which BIOGEST has assimilated both at home and all over the world. It goes without saying that the applicable national regulations or tender conditions are taken into account in every case.

BIOGEST PURITAINER has following advantages-

- delivery at short notice
- container-style construction
- manufactured to ISO standards
- ready-to-connect unit

**Switchgear**

- fully automatic plant operation
- simple to extend using
- modular construction

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