



# Integrated Water Resources Management – Model Region Mongolia –



## ***MoMo Fact Sheet***

### *Decentralized Waste Water Management: Experiences from Pilot Operation in Orkhon Sum*

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## Technology Description

WSB<sup>®</sup> clean comes in different designs for private, industrial and municipal usage. Clarification plants of the WSB<sup>®</sup> clean series works from 4 up to 5.000 users. WSB<sup>®</sup> clean is a pure biofilm technology – it used a specifically developed carrier material.

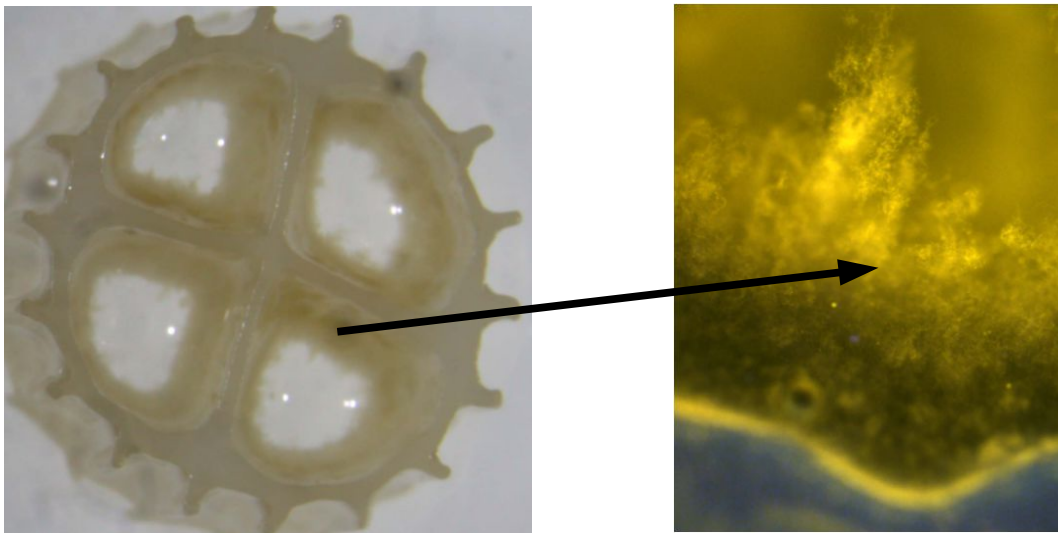


Fig. 1: Biofilm carrier

By the small size of the carrier material, the microorganisms have a large surface area on which to form the extremely efficient biofilm for the long-term high cleaning performance. It facilitates complex decomposition processes that lead to optimal discharge values. The technology works just as well in the opposite case of underload. This occurs during prolonged non-utilization, for instance if the user is on vacation. It also occurs when permanently less people than originally planned use the small wastewater treatment plant. Both cases, can lead to the dying off of the biology (autolysis) and thus costly plant outages in other clarification technologies.

WSB<sup>®</sup> Clean is a fully biological wastewater treatment plant designed to treat domestic wastewater in 3 steps.

1. Incoming wastewater travels by gravity through the pretreatment step where coarse particles settle.
2. Preprocessed wastewater is now fed into the biological stage which contains the specially designed plastic carrier media. Microorganisms settle on the media and consume the organic material in the wastewater. Oxygen is needed for the biological cleaning process.
3. The final clarifier collect and transfer the secondary sludge back to the sludge storage. From the clarifier, the biologically cleaned wastewater is ready to be discharged back into the environment.

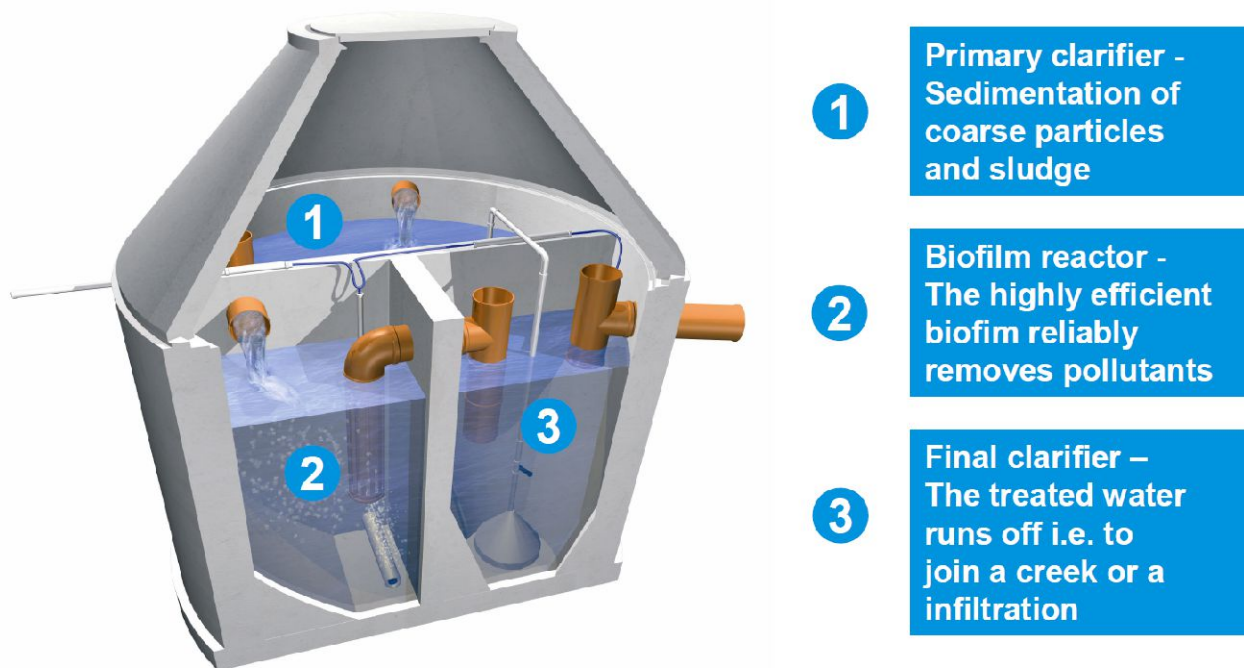


Fig. 2: Design of the WWTP

The system is equipped with a control unit for the electrical supply and automatic control of the compressor and sludge return pumps. In order for optimal operation to occur at minimum energy consumption, the biological aeration occurs intermittently with flexible operation and rest settings. Actual operating parameters can be precisely defined to take into account the varying load time throughout the course of the day. The operation cycle of the sludge return pump is designed so that the final clarifier is completely clean of secondary sludge. Sludge is typically produced at a very low rate – lower than most activated sludge systems.

The control system WSB<sup>®</sup> control M2M optimizes the operation of a small sewage treatment plant. All important information on hours of operation and status signals are reliably stored. The maintenance company can easily check and adapt settings if required. Furthermore, the unique technology safeguards all data even during extended power failures.

### Adaptation to Harsh Climatic Conditions

An important benefit of the WSB<sup>®</sup> System is the ability for adaptation to extreme climatic conditions. The engineer team can use operating experience from countries with extreme climatic conditions from cold winters to very hot summers. For extreme low temperatures experience from Canada and Scandinavia is available. In Europe the system have a certification according to DIN EN 12566-3.



## Experiences from Pilot Operation

The treatment plant is designed for a kindergarten (50 PE) to replace an existing treatment plant (old septic tank system without biological treatment).

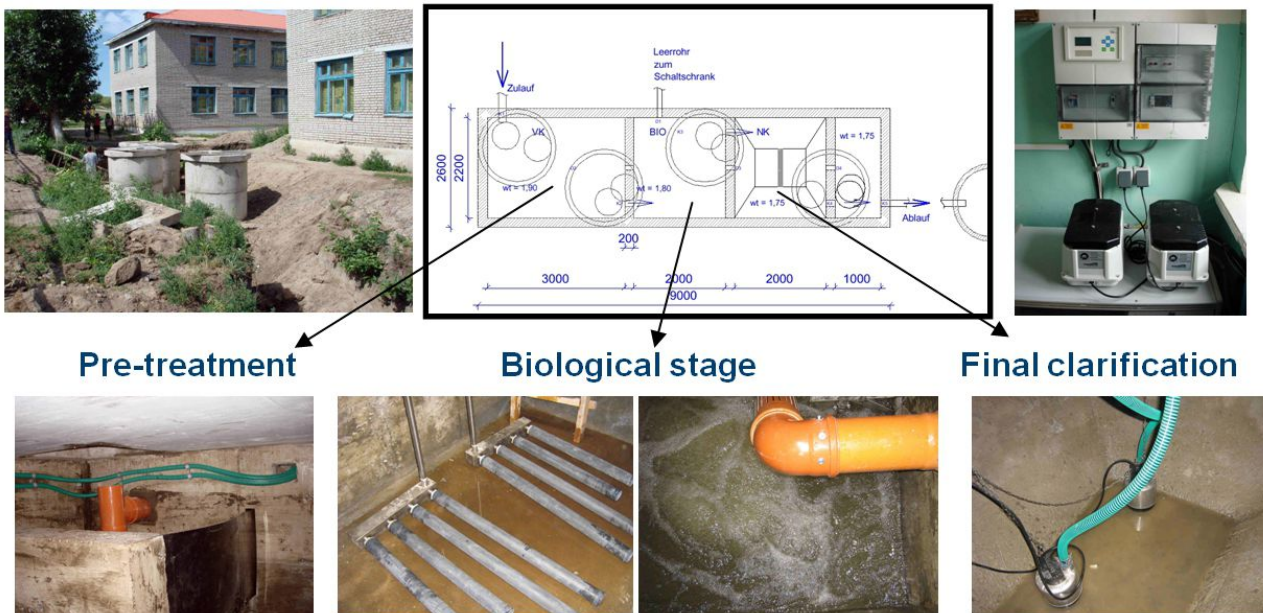


Fig. 3: Realization of the decentral WWTP in Orkhon Sum

The objective of the two-year operation period of the pilot plant is the adaptation of this flexible technology to the varying sewage loads under extreme climatic conditions, thereby achieving better treatment results than the existing WWTP. The treatment process is optimized for low energy consumption and minimal operating cost. The trial results will be implemented in the basic design of a standardized series for single houses and group solutions ranging from 5 to 5.000 PE. Specific process benefits include:

1. Media is self cleaning and never has to be replaced
2. Robust system able to handle shock loading and extremely long periods of low loading
3. Low sludge generation
4. Low consumption of energy and minimal operating costs
5. Nitrification at temperatures below 12°C
6. Simultaneous nitrification and de-nitrification of at least 30 to 50%

Since its commissioning, the pilot plant in Orkhon soum has been a point of interest for a lot of experts, authorities and visitors, including the Mongolian Minister of Nature, Environment and Tourism. Interests of transfer and implementation of the WSB® System in the private and public sector in Mongolia are very high. The technology will be standardized by Ministry of Road, Transport and Urban Infrastructure for the implementation in other rural regions of Mongolia currently.

## Key Data

Location:	Orkhon Sum, Darkhan-uul Aimag, Mongolia 49.8338889°N / 106.1361111° E
Manufacturer:	Bergmann Clean Abwassertechnik GmbH in cooperation Undurkhash Ltd.
Type of pilot measure:	Biofilm waste water treatment system – WSB® clean
Capacity of the pilot plant:	7.5 m <sup>3</sup> /d (50 PE)

## Project Partners & Contact Information



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Darkhan Uul Aimag



Mongolian University of Science and Technology  
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