



**BIOLAK® Technology GmbH**

COMPETENCE IN WATER AND RENEWABLE ENERGY



## BIOLAK® Integral System

A multistage wastewater treatment plant including biological nitrogen and phosphate removal



Municipal plant, 40,000 m<sup>3</sup>/d - 165,000 PE<sub>60</sub>

# Wastewater treatment plants for municipalities and industry

## Municipal BIOLAK® Integral plants

BIOLAK® Integral is especially powerful because of its hydraulic buffer, its integrated final clarification and the high efficiency of the BIOLAK® aeration system. BIOLAK® Integral was implemented for municipal plants from 300 to over 3,000,000 PE<sub>60</sub>.



Municipal plant Hungary, 4,400 PE<sub>60</sub>

## Industrial BIOLAK® Integral plants

Wastewater treatment plants with capacities from 0.5 to 200 t COD/d for the following industrial sectors have been realized and illustrate the versatility of the system:

### Food Industry

Breweries / Malt houses

Soft drinks production

Fruit processing

Dairies / Cheese production

Protein production

Yeast production

Potato processing

Starch factories

Slaughter houses

Canneries

### Other Industries

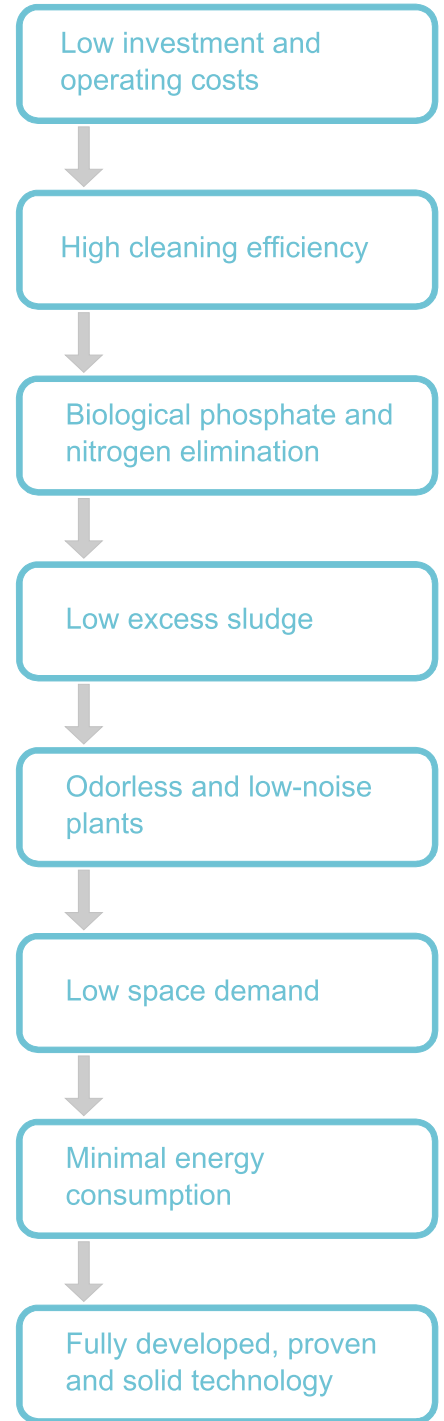
Textile industries

Pulp and paper

Rendering industries

Petrochemical industries

Chemical industries



Plant for pulp and paper industry  
60,000 m<sup>3</sup>/d - 1,300,000 PE<sub>60</sub>



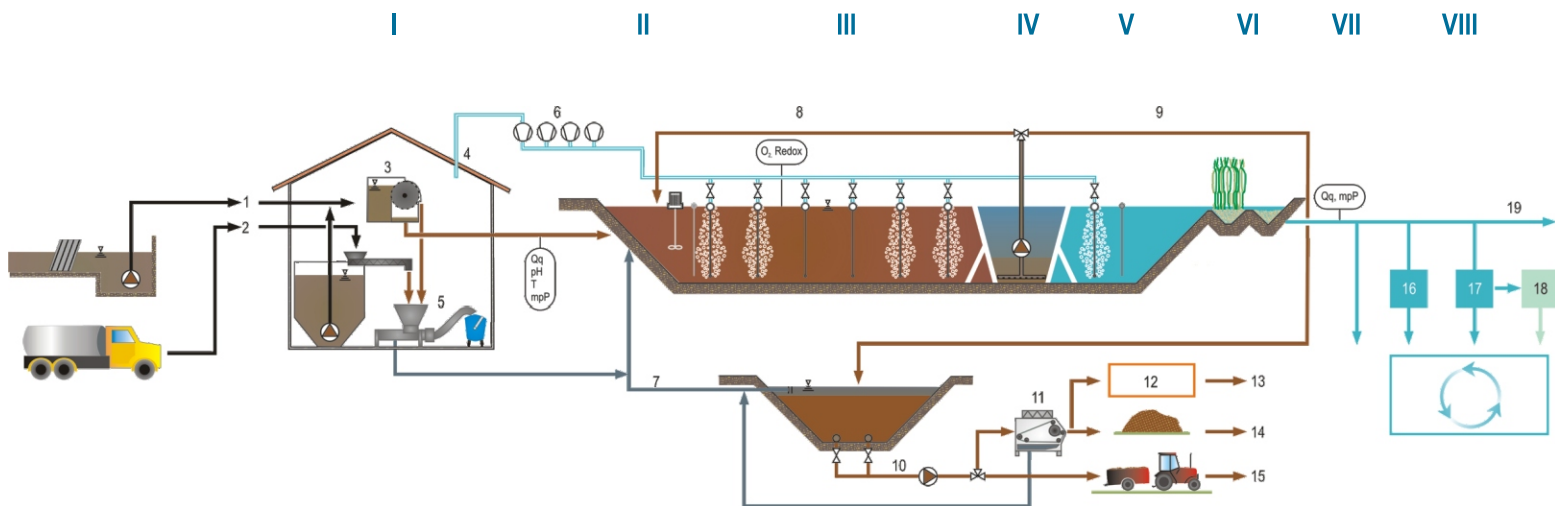
# Advantages of BIOLAK® Integral

BIOLAK® Integral plants are built in multiple stages and often in multiple lines. At the same time a very high process stability and an excellent cleaning capacity are reached.

- By its integral construction, it is possible to integrate all the cleaning stages in one basin. This minimizes the necessary technical equipment expenditure, which leads to a very low energy consumption and reduces investment and operating costs considerably.

- The maintenance expenditure of BIOLAK® Integral plants is very low, while the occurring maintenance works are rather uncomplicated.
- Owing to their optimum dimensioning BIOLAK® Integral plants achieve a low excess sludge production.
- The effluent of BIOLAK® Integral plants can be reused directly as (process) water or treated to such extent that it can be used as drinking water.

## BIOLAK® Integral Concept



- |            |                                                                                                                                         |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Stage I    | Mechanical pre-cleaning                                                                                                                 |
| Stage II   | Biological elimination of phosphates (Bio-P-Zone)                                                                                       |
| Stage III  | Activated sludge stage with sludge stabilization, simultaneous nitrification/denitrification (BIOLAK® WOX) and biological hygienisation |
| Stage IV   | Final clarification stage for sedimentation of activated sludge from water                                                              |
| Stage V    | Post aeration and advanced treatment                                                                                                    |
| Stage VI   | Biofilter: root layer and sand filter for elimination of smallest particulate material                                                  |
| Stage VII  | Most extensive hygienisation                                                                                                            |
| Stage VIII | Total cleaning for water recycling                                                                                                      |

- |                              |                               |                    |
|------------------------------|-------------------------------|--------------------|
| 1 Inlet                      | 8 Return sludge               | 15 Sludge 4%DS     |
| 2 Fecal sludge               | 9 Excess sludge               | 16 UV - Treatment  |
| 3 Fine screen                | 10 Automatic sludge discharge | 17 Ultrafiltration |
| 4 Suction of odor            | 11 Sludge press               | 18 Reverse osmose  |
| 5 Hydraulic screening press  | 12 Drying                     | 19 Outlet          |
| 6 Blower station             | 13 Sludge 85%DS               |                    |
| 7 Filtrate/Supernatant water | 14 Sludge 20-25%DS            |                    |



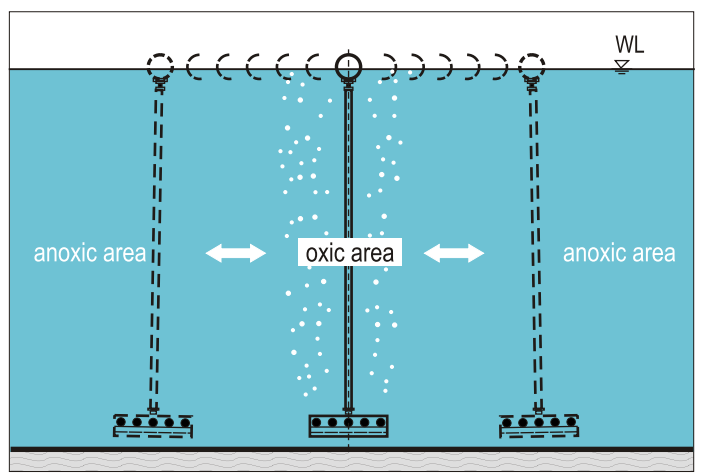
# Technical details

## BIOLAK® aeration

The main characteristic of the BIOLAK® Integral system is the moving aerator chains covering each section of the activated sludge basin and providing equal and economical oxygen supply with guaranteed odorlessness.

- By moving the chains from sections of high oxygen content to sections of poor oxygen content, the aeration is effected with a very high oxygen transfer ratio. In this way BIOLAK® aerators are saving up to 20% of energy in comparison with conventional aeration.

- Maintenance works on the aerators can also be performed in the case of full basins, while the remaining chains are in Operation.
- The sludge is kept in the water column by the aeration.
- The intelligent WOX system enables a multicascade denitrification by effective aeration management.



## Best cleaning results even under difficult climatic conditions

The intelligent design of BIOLAK® Integral plants ensures best cleaning results even at high ambient temperatures (e.g. in Saudi Arabia).

In extremely cold areas the direct parallel position of the activated basin and clarification is great advantage. The heat released by the biological activation in the activated

basin heats the post clarification which is only separated by a plastic partition wall from the activated basin. This is to avoid freezing of the basin in winter months and to ensure a continued and proper operation of BIOLAK® Integral plants also in Finland, Russia or Inner Mongolia throughout the year.



Municipal plant in Saudi Arabia, 100,000 PE<sub>60</sub>



Municipal plant in Poland, 4,200 PE<sub>60</sub>

# Technical details



## BIOLAK® Integral basing lining

High quality and reliable sealings are a prerequisite for the application of earth basins in the construction of wastewater treatment plants. As in the case of dumps for toxic disposal, BIOLAK® Integral is also working with HDPE-lining.

- Welding is carried out by TÜV (= Technical Inspection Authority) certified welders according to strict guidelines.
- The flexible lining is more earth-quake-proof and insensible to sedimentation than concrete constructions.
- HDPE-lining is designed to have a lifetime of at least 50 years.
- Even conventional concrete plants are reconditioned with HDPE lining.



## Integrated post clarification

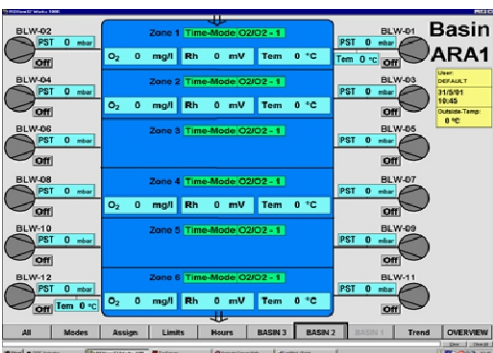
The integrated final clarification is extremely intensive and reliable. Even in cold climate zones (-30°C) it is working properly.



## Earth-basin construction

The basin edges can be stabilized by using L-Stones.

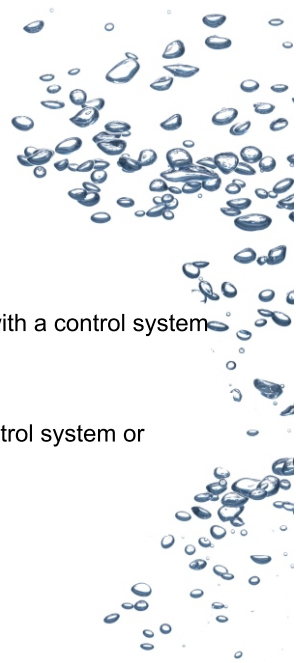
BIOLAK® Integral uses the earth-basin construction in order to erect inexpensive, solid and completely sealed basins.



## Adjustment and control

BIOLAK® Integral combines the extremely simple configuration with a control system according to the latest technology.

Depending on the customer's request, either a conventional control system or modern computerized control technology may be used.



# BIOLAK<sup>®</sup> Integral process alternatives

## BIO-P-ZONE for biological phosphate elimination

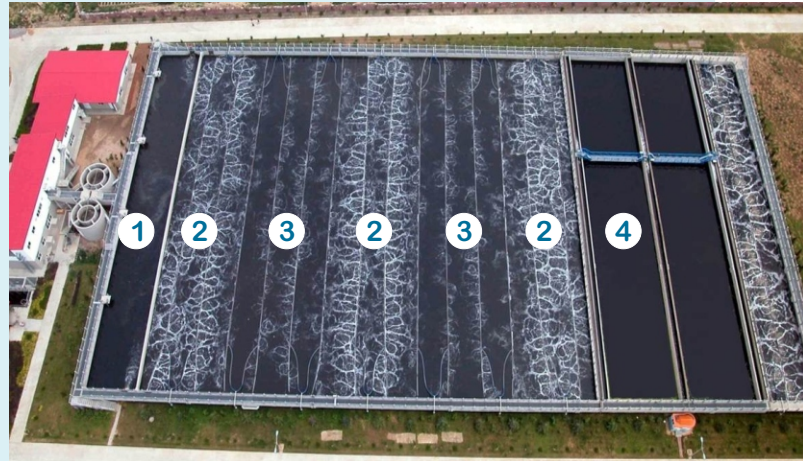
For the advanced biological phosphate elimination, a Bio-P-Zone is superposed before stage III.

A chemical phosphate precipitation will be installed in case of specific sewage disposal conditions, high phosphate contents in the wastewater or as a safety stage.

## BIOLAK<sup>®</sup> WOX for nitrogen removal

The aeration chains in the activated sludge basin are alternately charged with air. Such alternation of aerated and unaerated zones causes a multistage denitrification which is the secret of BIOLAK<sup>®</sup> WOX system's extremely high efficiency.

- 1 Bio-P-Zone
- 2 Oxidic Zone (Nitrification)
- 3 Anoxic Zone (Denitrification)
- 4 Integrated clarifier



Municipal plant, 40,000 m<sup>3</sup>/d - 167,000 PE<sub>60</sub>

## Biofilter for further reduction of suspended solids

As Stage V, the biofilter with an active root layer and "vertical" sand filter proved to be very effective. With low investment costs and minimal current costs, best outlet values are reached.

## Refitting

The refitting of a highly efficient aeration in plants with surface aerators, ponds or any other conventional plants can be realized in a very simple and economical way by application of our BIOLAK<sup>®</sup> Integral system.

Using the existing basin in most cases and considering the low expenditure at installation of the aeration, the reconstruction or refitting can be realized, partially even without emptying the basin at minimal or no downtimes at all.



# What makes BIOLAK<sup>®</sup> Integral so economical?

## Construction method, water flow, operation building

Earth construction, integration of Bio-P-Zone, activated basin with denitrification and post clarification in one reactor enable savings of construction costs of up 20% compared to the usual concepts.

The operation buildings contain pretreatment, compressor station and control system including all operating rooms and

combine these in a functional way (e.g. odor control and heating) contributing to further savings.

## Aeration

The "moving aeration" enables a 20% higher energy utilization compared to permanently installed systems. Maintenance works are very easy and economical. They can be performed while the plant is in operation. Interruptions are not required.

# Experience, service and customer support

## Over 35 years of experience all over the world

Since the member companies of BIOLAK<sup>®</sup> GROUP were founded in 1973, they have expanded their activities in process engineering all over the world. They have built plants for biological wastewater treatment, biogas production and refinement of fermentation residues according to their patented systems. Reference is made to 750 plants built worldwide, many of which have been installed in Asia, the United States, Europe, Central America, the Middle East and Africa.

## Training and effective support

All systems are delivered to the customer with a training program tailored to the specific requirements of the client and is performed by experienced process engineers.

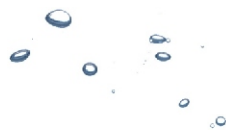
Our personnel accompany the operation of the plants,

also after handing-over to the customer. Regular visits and immediate support in case of any problems are of course part of the Service, as well as a monthly check of the operating parameters. This allows the client's operating personnel to benefit from the extensive experience of BIOLAK<sup>®</sup> Technology GmbH. The client will never be left out in the rain!

## Customer support

Our plants' engineering includes the entire **technical equipment** of the plants. It consists of the design, control, installation and commissioning of the plants, as well as the extensive training of operating personnel. A continuous contact to the customer is ensured by local representatives and partners in each individual country.

This is to ensure that special requirements of the countries recognized and reflected in the concepts are taken into consideration.



Municipal plant, 40,000 m<sup>3</sup>/d - 200,000 PE<sub>60</sub>



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