

## BSK<sup>®</sup>-Turbines for Sewage Aeration

# PRODUCT PROFILE IN SHORT

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### 1) Aeration Systems for Wastewater Treatment Plants

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For the operation of biological treatment plants oxygen supply and mixing capacity is required for the aeration tanks. Two typical technologies are used:

- a) **Fine-Bubble-Aeration-Systems**, mainly consisting of membrane plates (installed at the bottom of the aeration tanks) and rotary piston blowers, being connected to the membrane elements by a complicated system of pipes.
- b) **Surface-Aerators**, which are placed in the centre of an aeration tank mounted on a fixed bridge or a floating construction. To each surface aerator belongs a motor drive with speed reducer.

The most reliable installation with a minimum of wear and tear is the surface-aeration system. Thousands of existing plants all over the world are a convincing proof. This is the reason why surface-aeration is part of nearly all wastewater treatment plants under construction or being designed for future projects.



### 2) Main Features of a Surface-Aerator

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The aeration of activated sludge in an aeration tank of a biological treatment plant requires a special and well-adapted design of the used equipment. With respect to surface aeration systems, there are extreme differences regarding the construction and shape.

To understand the importance of a capable aerator-construction, the main characteristics should be pointed out:

- a) **Great mixing capacity**, which guarantees a total and turbulent mixing of the tank-content – especially at the bottom area, where no settling is allowed.
- b) **Perfect oxygen supply** and transfer to all points of the aeration tank.
- c) **High efficiency** meaning a maximum of oxygen input capacity at a minimum of power requirement. The operating costs of a plant can be greatly reduced, if a perfect relation of oxygen supply and required electrical energy is possible.
- d) **Long life construction** guaranteed by durable and service-free materials.

### 3) The BSK<sup>®</sup>-Turbine and its Characteristics

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The first series of BSK<sup>®</sup>-Turbines were developed by the famous Swiss Company BSK<sup>®</sup> (NORM A.M.C. AG) approx. 15 years ago. Until now more than 4.000 units were produced and are operating in more than a thousand sewage treatment plants. Some years ago an improvement of the construction and design was performed. Consequently, the second generation of BSK<sup>®</sup>-Turbines the efficiency could be increased. Moreover, for the plastic material a new type of polyester was found, which guarantees an improved resistance against acid that could occur specially in industrial wastewater.



Compared with surface aerators produced by other manufacturers, the BSK<sup>®</sup>-Turbine serves following important advantages:

- a) **Perfect mixing capacity**
- b) **High Oxygen input capacity**
- c) **Low energy requirement**
- d) **Long operation life**

Why are the above-mentioned features of the BSK<sup>®</sup>-Turbine possible? Following reasons demonstrate the difference to other aeration systems:

**Reason No. 1:** The **special design** of the turbine blades improves the hydraulic capacity. According to the well-known „Francis-Turbine“, the form of the blades was optimized and guarantees an operation with excellent spread characteristics.

**Reason No. 2:** The **surface of the turbine material** is absolutely smooth and prevents hydraulic losses.

**Reason No. 3:** The **special compound** of the glass-fibre-reinforced plastic material is extremely resistant to all ingredients of domestic and industrial wastewater.

**Reason No. 4:** The **extremely high pumping capacity** guarantees a perfect mixing of the aeration tank, as the movement of the tank-content is huge and enormous.

**Reason No. 5:** Added by a **specially formed flow direction cylinder** (which is placed below the turbine) the efficiency of oxygen-input as well as the mixing capacity is improved for more than 20 % of the standard performance data.

**Reason No. 6:** The **speed of the BSK<sup>®</sup>-Turbine** can be steplessly adjusted to the oxygen input requirements. Moreover, the necessary mixing (not aeration) can be performed at low speed during the so-called „denitrification-phases“.

**Reason No. 7:** The **turbine-drive-system** is designed for a long-term operation with not more than a yearly maintenance and oil-service.



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