

# ABSEffeXrange

The world's first submersible mixer concept  
with a permanent-magnet motor



# Major benefits for optimal lifecycle economy

The ABS EffeX Revolution embodies continuous striving to design, develop and manufacture the most innovative and resource-conserving solutions on the market to meet current and future needs of the wastewater industry, particularly as regards saving energy. They involve stretching the limits, achieving performances not possible before by building on our future-oriented R&D and the innovation already applied to many of our products.

In 2009, this approach began with the introduction of the world's first submersible sewage pumps with a premium-efficiency motor ABS submersible sewage pump XFP. Now the next step of the ABS EffeX Revolution involving breakthrough technology is the launch of the world's first submersible mixer concept with a permanent-magnet motor. Our long and proven know-how on the use of permanent-magnet motors derives from its development and inclusion in our range of ABS turbocompressors HST.



## **The latest technology**

The new ABS submersible mixer concept XRW incorporates the latest technology, including a permanent-magnet motor, to ensure optimal lifecycle economy. This ABS EffeX solution offers long-term reliability, minimal maintenance and maximal equipment lifecycles, but most of all, greater energy saving to cut power consumption and reduce the CO<sub>2</sub> footprint.

The major benefits are presented below.

## **Lowest energy consumption**

Using IE3 permanent-magnet motors together with optimized and proven propeller designs enables the ABS submersible mixer concept XRW to achieve the lowest energy consumption possible for medium-speed mixing. You gain a total efficiency improvement of up to 35% compared with other existing medium-speed mixer designs.

## **Greater process control**

A further benefit of our permanent-magnet motors is a variable-speed drive that allows processes to be optimized and energy consumption to be minimized in addition to the energy savings obtained through using high-efficiency equipment designs.

## **Fewer mixers for wide application**

Our new technology using variable-speed, permanent-magnet motors results in a limited number of basic mixer sizes that still covers a wide range of applications. This greatly reduces the need to stock spare equipment and parts without increasing the risk of operational downtime.

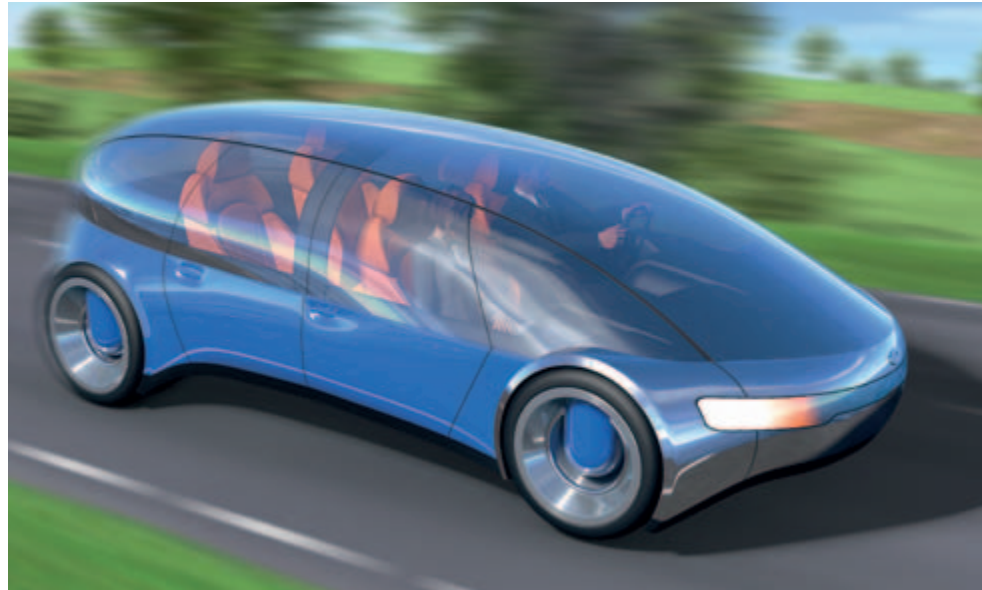
## **Cost-effective maintenance**

The combination of compact design and considerably reduced weight allows easy mixer installation and removal. Together with fewer basic mixer sizes and the ABS EffeX Exchange Program for permanent-magnet motors, you get cost-effective maintenance without the need for specialist equipment.

## **Superior reliability**

Much greater reliability of the new ABS submersible mixer concept XRW results from:

- High overload capacity
- 100,000-hour bearing life with a better bearing environment achieved by using low-temperature IE3 permanent-magnet motors
- Optimized mechanical seal
- Enhanced solid deflection ring design



*The new ABS submersible mixer concept XRW with a permanent-magnet motor is breaking barriers to set new standards. It is based on future-oriented R&D and innovative technology that help to provide people with clean water while simultaneously reducing energy consumption significantly.*

## Join the ABS EffeX Revolution

Make the right choice if you want to be first ...  
... or more importantly, the first choice if you want to be right!

# An overview of permanent-magnet motors

Permanent-magnet motors have been commercially available for about 20 years, but it is only recently that the lower prices of components and better technology have made them more attractive for a range of applications. The greater demand for energy-saving devices, particularly in the face of tougher legislation to reduce energy consumption worldwide, is further increasing the popularity of these highly efficient motors.

## **VFD-driven**

Other crucial factors in driving the development of permanent-magnet motors are the high cost of copper, which has less impact on permanent-magnet motors because they lack rotor windings. In addition, the continuous reduction in the cost of variable frequency drives (VFD) now makes permanent-magnet motor technology commercially attractive.

## **Sensorless control**

With permanent-magnet motors, a controller involving an algorithm is used to monitor the position of the rotor. To enable this, some designs use Hall effect sensors or an encoder to directly measure rotor position. The ABS submersible mixer concept XRW uses the measurements of the reacting electromotive force (EMF) in the windings of the stator magnets to determine rotor position. As this avoids using Hall sensors, this type of design is often called sensorless control.

## **So many benefits**

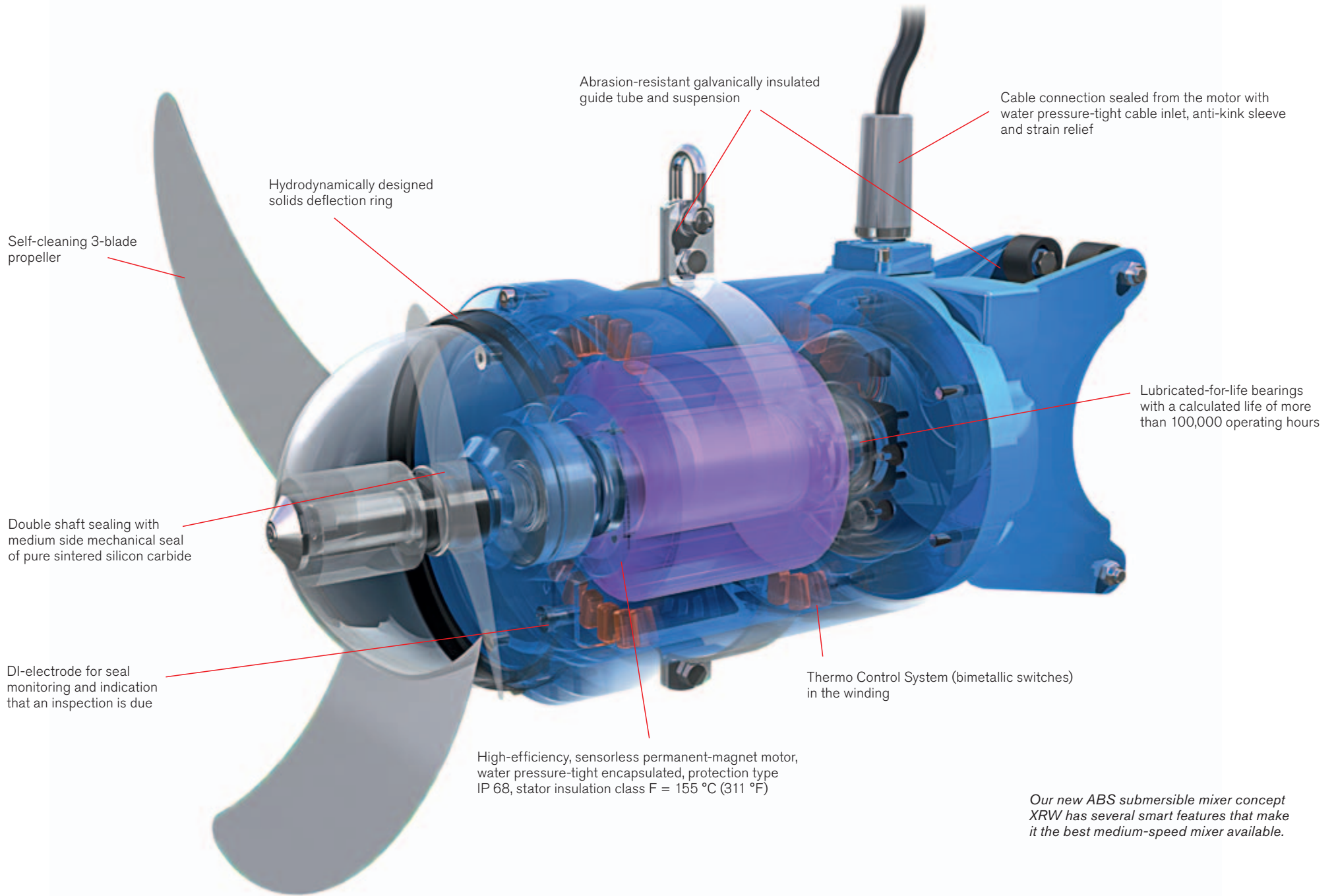
Compared with the conventional use of inverter-controlled (VFD) motors, permanent-magnet motors have many benefits as listed below. And although these motors have a higher initial cost, this is quickly recovered through their greater efficiency and significantly reducing energy consumption.

The many benefits of permanent-magnet motors include:

- Higher motor efficiency within a wide speed range
- Greater reliability and longer lifetime
- Lower operating temperature
- Compact design and less weight
- Lower electrical power to drive the motor
- Flexible system operation

As there are numerous applications that demand one or more of these benefits, the future looks bright for permanent-magnet motors.





Abrasion-resistant galvanically insulated guide tube and suspension

Cable connection sealed from the motor with water pressure-tight cable inlet, anti-kink sleeve and strain relief

Hydrodynamically designed solids deflection ring

Self-cleaning 3-blade propeller

Lubricated-for-life bearings with a calculated life of more than 100,000 operating hours

Double shaft sealing with medium side mechanical seal of pure sintered silicon carbide

DI-electrode for seal monitoring and indication that an inspection is due

Thermo Control System (bimetallic switches) in the winding

High-efficiency, sensorless permanent-magnet motor, water pressure-tight encapsulated, protection type IP 68, stator insulation class F = 155 °C (311 °F)

*Our new ABS submersible mixer concept XRW has several smart features that make it the best medium-speed mixer available.*

# High performance throughout a wastewater treatment plant

The new ABS submersible mixer concept XRW can be used at various steps of a wastewater treatment plant. This mixer provides the high efficiency, greater reliability and minimal maintenance needed to dramatically reduce operational costs, while simultaneously providing the best process control from just one mixer through variable-speed drive and precise speed control.

The wastewater treatment steps that benefit from the ABS submersible mixer concept XRW are described below.

## Equalization

The objective of mixing during the equalization process is to blend the wastewater and to prevent sedimentation, stratification and odour formation. The ABS submersible mixer concept XRW is the best solution as the water levels in this part of the process are often very low and have a tendency to change frequently. The configuration of the ABS submersible mixer concept XRW to use is determined by the intensity of mixing and flow required.

## Selector (Contact zone)

In the selector tank the aim is to control and limit the growth of filamentous bacteria, which enhances the sludge sedimentation ability. Our submersible mixer concept is used for intensive (flash) mixing of the re-circulated sludge and wastewater.

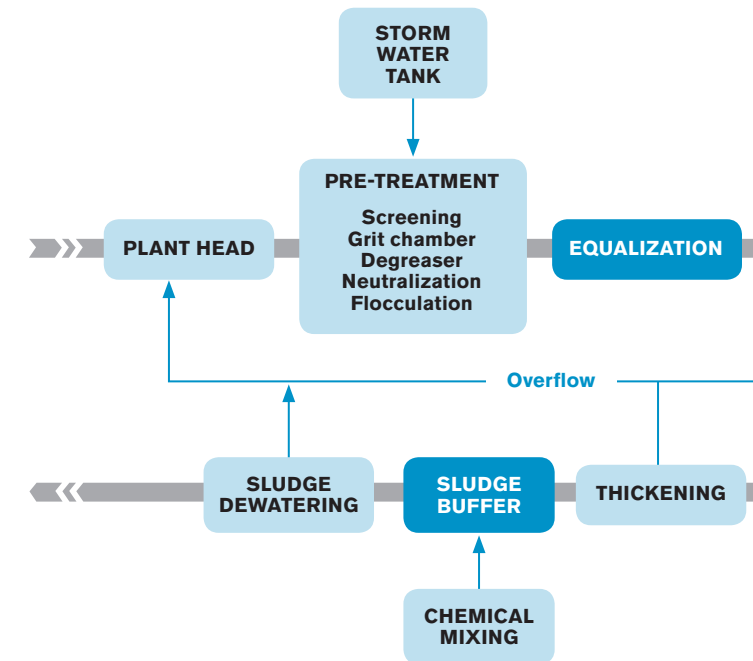
## Biological processes (Anaerobic and anoxic)

In the anaerobic and anoxic tanks the biomass has to be kept in suspension in order to avoid the risk of the sludge settling and to maximize the active volume. The target is to provide good contact between the inlet wastewater, recirculated sludge and biomass.

Our submersible mixer concept can be used to provide sufficient mixing energy to keep the biomass in suspension.

## Sludge buffer tank

Blending and homogenization of concentrated primary, secondary or digested sludge are the most common applications in the sludge buffer tanks. The ABS submersible mixer concept XRW can be used successfully here.

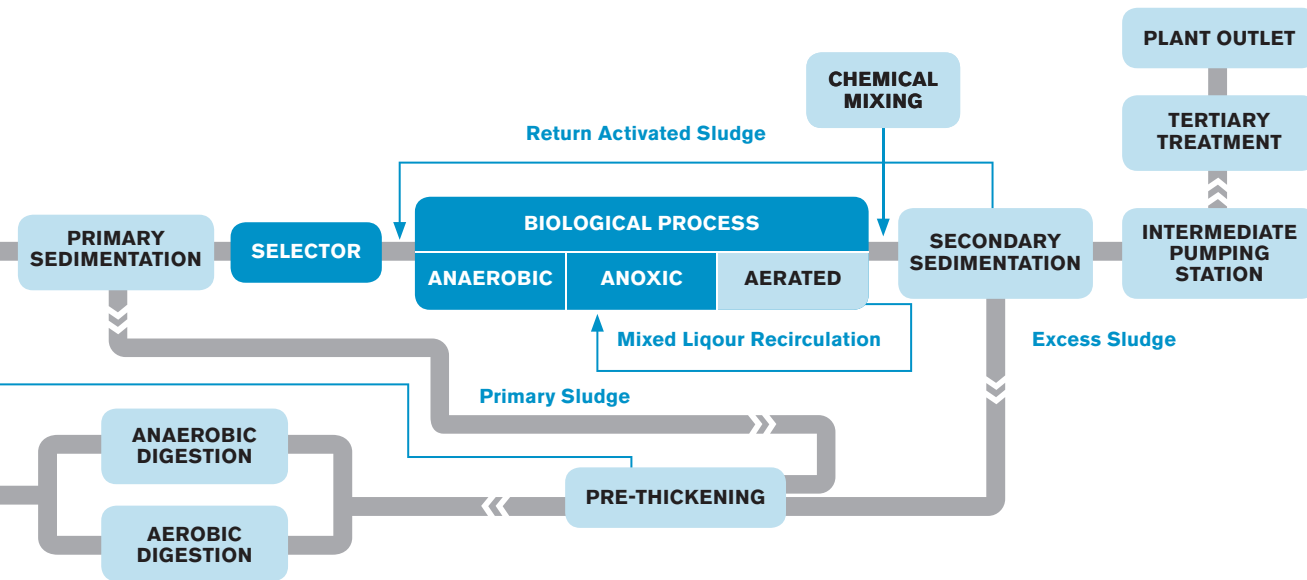


## ABS SUBMERSIBLE MIXER CONCEPT XRW

Propeller diameter: 650 mm

Rated motor power: 5.5 kW – 7.5 kW – 10.0 kW

Mixer thrust up to: 2500 N



### Strong local service

As part of Cardo Flow Solutions, ABS is represented in more than 100 countries with a strong local presence. Therefore we provide good service facilities and support no matter where you are. We offer an ABS EffeX Exchange Program for permanent-magnet motors, you get cost-effective maintenance without the need for specialist equipment. In addition, we can provide alarm management and 24-hour breakdown services. A sophisticated stocking system has also been developed with international hub locations and on-hand stocks of key products in order to ensure rapid and reliable availability of the product on-site when needed.

### The wastewater specialist

The ABS brand is synonymous with innovation and well-proven solutions for wastewater collection and treatment. Good customer relations have enabled us to build up extensive application expertise. We understand and solve the challenges of municipal, industrial, commercial and domestic end-users worldwide every day. And we help professionals design, select, install and service wastewater systems of any type.

We take care of you throughout the lifecycle of your investment – before, during and after.



## Join the ABS EffeX Revolution

Make the right choice if you want to be first ...  
... or more importantly, the first choice if you want to be right!

[www.ABSEffeX.com](http://www.ABSEffeX.com)

### Meeting global challenges

ABS is a world-leading Cardo brand with a long tradition in the wastewater industry. ABS offers more than 100 years of application experience and manufacturing of customer-oriented solutions using the latest technology.

The result is the development and supply of integrated ABS- branded solutions and individual products for use in the wastewater segments: Domestic and Commercial Wastewater, Wastewater Collection Networks and Wastewater Treatment.

Cardo is a world-leading supplier of industrial doors and logistics systems, wastewater treatment systems, process equipment for the pulp and paper industry, and garage doors.

Cardo delivers solutions that help to solve some of the toughest challenges of our time in the fields of water, transportation and energy. The company's operations are pursued in the two divisions: Cardo Entrance Solutions and Cardo Flow Solutions.

For full contact details, see [www.absgroup.com](http://www.absgroup.com)

