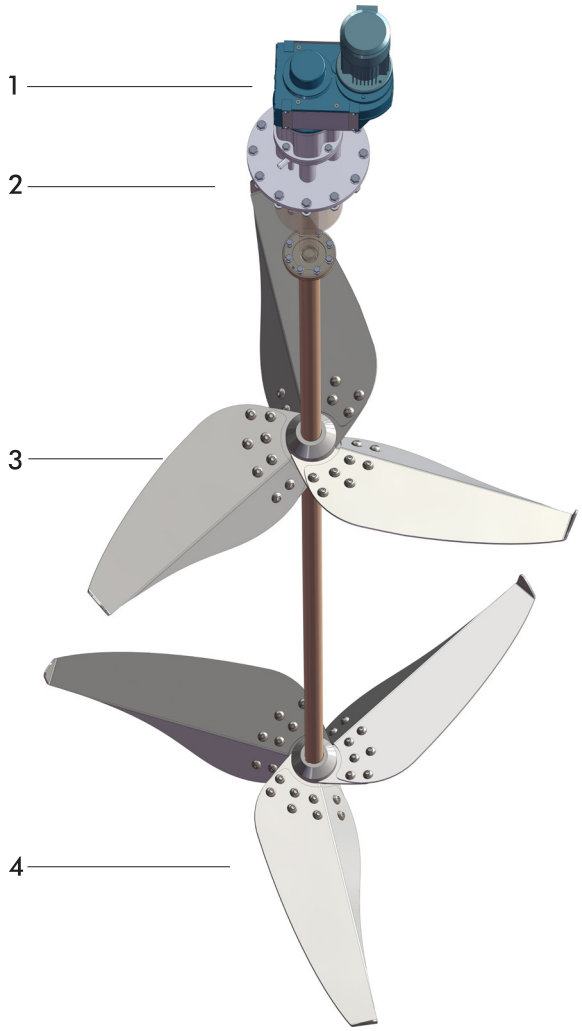
INVENT CYBERSLUDGE® Mixer

Mixing – Circulation – Homogenization in Waste Sludge Digesters

One of the key-parameters for the overall energy efficiency of a biological wastewater treatment plant is the ability to produce a high amount of methane gas in the waste sludge digesters. The more gas can be delivered to the biogas motors, the more energy can be produced to run the various machinery components on the plant. The amount of the gas production in a sludge digester depends on the quality of the sludge and the correct mixing, circulation, and homogenization of the waste sludge in the digester.

INVENT's fluid mechanical know-how, it's vast experience in the field of mixing, combined with its passion for developing innovative products, has led to **CYBERSLUDGE**®, the **INVENT** Mixing System for sludge digesters.



The **INVENT CYBERSLUDGE**® Mixer: 3D representation

DESIGN

The design of the **INVENT CYBERSLUDGE**® Mixer relies on a conventional drive train, which drives a solid stainless steel shaft with single or multiple **CYBERSLUDGE**® Mixing Elements.

CONSTRUCTION

1 Drive Train

The **CYBERSLUDGE**® Drive Train consists of a heavy duty motor-gearbox combination. It sits on a sturdy mixing lantern, which is designed to accept the high axial and radial loads that are imposed on the whole drive train. Below the lantern a gas seal is positioned which prevents gas from leaking out of the digester into the environment.

The complete drive train is certified according to ATEX Directive 2014/34/EU (formerly Directive 94/9/EC) in gas or dust explosion-proof designs.

2 Seal

The gas seal as well as the other drive train components can be tailored to the client's demands and specification. The standard designs feature a water lock or a mechanical seal.

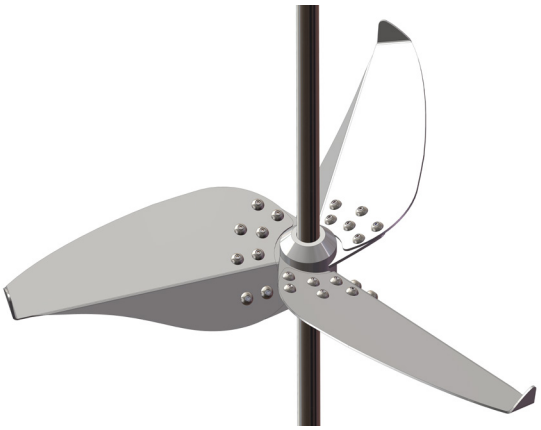
3 Shaft

The shaft is machined from solid steel piece and consists of a minimum of two sections. The upper shaft section is pre-assembled into the drive train and ends below the seal with a flange. The one or more lower sections are supplied separately and connected via flange couplings on site.

The shafts can be supplied in stainless steel or coated carbon steel or according to the client's specification.

4 CYBERSLUDGE® Mixing Element

The **CYBERSLUDGE**® Mixing Element was developed especially for the harsh operation in waste sludge with high solids concentration and viscosities. It is made from stainless steel, coated carbon steel or manufactured according to the client's specification.



CYBERSLUDGE® Mixer: Mixing Element in detail

It features a fluid mechanically optimized 3-bladed design. The main optimization objectives were the generation of:

- a sufficient level of shear forces,
- a high pumping rate at low energy consumptions, and
- a jet-type flow pattern without the use of a draft tube

The shape, inclination, camber, and the winglets are composed in such a way that the above objectives could reliably be met and a heavy duty, sturdy design could be realized.

CYBERSLUDGE® SELECTION AND LAYOUT

The **INVENT CYBERSLUDGE**® Mixer is available in various designs and layouts. We select the appropriate design based upon several factors including the reactor size and geometry, solids concentration, and rheological behavior of the waste sludge. We also carefully consider the position and design of filling and draining points as well as the operational strategy. The following table gives an overview over the technical range of the **CYBERSLUDGE**® Product Family.

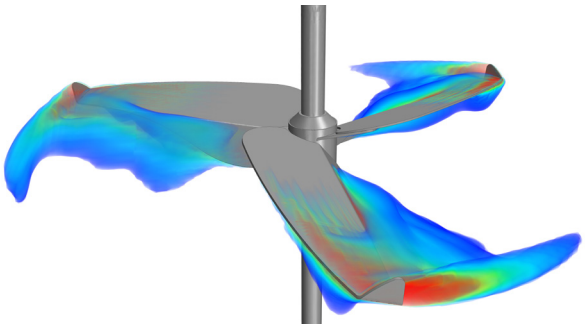
Technical Data

Motor Power, P	1.1 – 30 kW
Shaft Diameter, d	40 – 300 mm
Shaft Length, l	≤ 20 m
Rotational Speed, n	15 – 52 UpM
Mixer Diameter, D	500 – 3,000 mm

OPTIONS AND ACCESSORIES

INVENT can supply the **CYBERSLUDGE**® Mixer with an automated water level control unit for water locks and/or variable frequency controllers to adjust the rotational speed and rotational direction of the mixer according to the operational scheme. For larger tanks and longer shafts a bottom guide bushing is available.

CYBERSLUDGE® Mixer: Ready for start-up



Rendering of magnitude velocity around the mixer body

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