Liquid Manure Technology

System technology for farming

Engineered for life
Liquid Manure Technology

Species-appropriate husbandry for farmers requires reliable equipment that can master any technological problems that occur in the most cost effective way possible. In this respect Flygt’s liquid manure and biogas technology has been a pioneer for years, offering system solutions for husbandry operations with its submersible motor chopper pumps and submersible motor mixers.

Liquid manure farming in harmony with nature
Maintaining and tending to the natural soil – plant – animal – soil cycle is part of the farming tradition. It is a tradition to which we as manufacturers are committed. That is why we have developed systems for storing liquid manure in a way that is environmentally appropriate, for homogenizing it and for supplying it in spreadable form.

Machines and processes perfectly adjusted to one another
The different methods match the specific conditions in the individual operations. These Flygt systems have become the standard in modern liquid manure farming. Their development is based on experience and they are produced in accordance with high standards of quality. After all, quality is the key term for cost-conscious management, followed by the profitability factor of “appropriate technology”. With both factors Flygt’s liquid manure technology satisfies the requirements for reliable and permanent solutions.

This brochure contains information on the benefits of the tried-and-trusted Flygt submersible motor units and demonstrates exemplary ways of using them in various processes. The choice is yours. With our customer-oriented organization we are close to your farm to assist you – from consulting, project planning and construction of the system, all the way to technical support and maintenance.
Flygt submersible motor chopper pumps are specifically designed for pumping liquid manure with long-fiber components. Whether it is a simple or a demanding pumping job, ITT Water & Wastewater always offers the right solution for the entire range of tasks.

The chopper impellers of Flygt’s F series are particularly powerful and dependable. In combination with the nearly clog-free N hydraulics, they make for great operating reliability and reduce annoying and costly interruptions to a minimum. At the same time the F pumps offer a significantly wider range of applications, both with respect to output quantity and pressure head (water column up to 70 m / 230 ft, capacity up to 9 m³/min/2300 usgpm, engine power up to 26 kW/35 hp). Depending on the duty point, the special efficiency of the F series saves an average of 30 % of energy. Flygt submersible motor chopper pumps are specifically built for pumping liquid manure with long-fiber components.

- Compact construction
- Adaptable modular system
- Large number of applications with different chopper impellers
- High efficiency
- Cast-iron and High-chrome design
- Surface treatment for all parts which come in contact with the medium
- Standard and explosion-proof versions of the motors
- Motors for all standard power networks (special voltages and frequencies on request)
- Thermal monitoring protection in all pumps with standard and explosion protection
1 **Cable entry**
   Designed with sealing and strain relief functions.

2 **Terminal housing**
   Fully sealed inside and out.

3 **Long life bearings**
   The bearings on all Flygt pumps are designed to have a service life of at least 100,000 hours.

4 **Cooling system**
   The motor is cooled by the surrounding liquid. A cooling jacket is available for dry-installed pumps and other applications.

5 **Motor**
   Can reach a maximum operating temperature of (149 °C, 284 °F). Wound stator in insulation class H (180 °C, 356 °F), trickle impregnation.

6 **Deflection resistant shaft**
   A short overhang of the shaft virtually eliminates shaft deflection. This results in low vibrations, long seal and bearing life plus quiet operation.

7 **Monitoring**
   Thermal switches embedded in the stator winding protect against overheating. The inspection chamber is equipped with a leak detector.

8 **Inspections chamber**
   A separate inspection chamber, below the bearings, further increases operational reliability. The built-in sensor gives an early alert of any fluid build-up and allows for simple checking and maintenance. The sensor can be connected as an option.

9 **Seals**
   The Plug-in™ seal unit provides a perfect fit and faster, simpler replacement. The design also protects the seal surfaces during disassembly and mounting.

10 **Seal wear protection**
    Spin-Out™ is a patented design that protects the outer seal by expelling abrasive particles from the seal chamber.

**International standards approval**
Each pump is tested and approved in accordance with national and international standards (IEC 34-1, HI, CSA) They are also available in explosion-proof versions for use in hazardous locations approved by Factory Mutual and European Norm (FM and EM).
The N-Impeller
an alternative to the chopper system

If the risk of blockages during pumping of liquid manure is to be reduced to a minimum, Flygt pumps with N-impeller technology are the best choice. The patented hydraulic system is self-cleaning and constantly achieves high efficiency of over 80 percent.

At the core of the N-pump is the patented N-impeller, tried and tested in practical use. The unique semi-open construction of the impeller, combined with a relief groove in the pump housing, reduces the risk of blockages and ensures that the pump maintains its constantly high efficiency. This reduces the overall energy consumption and dramatically cuts the life cycle costs of the pump, making the N-pump series the ideal solution for liquid manure.

The innovative impeller:
- more efficient pumping
- pioneering work by ITT Water & Wastewater
- pressure head up to 100 m (320 ft)
- capacity up to 10 m³/min (2500 usgpm)
- engine power up to 26 kW (35 hp)
- standard and explosion-proof motor construction
- self-cleaning impeller and pump housing with a relief groove

N 3153 with cooling jacket
ITT Water & Wastewater provides handy pumps for a diverse range of applications, taking care of the “little” pumping jobs in farming. Despite their size, these Flygt chopper impellers and wastewater pumps range between 0.55 kW (0.75 hp) and 2.4 kW (3.2 hp), 60 Hz, offering delivery heads of up to 13 metres (42 ft) or a rate of 1 m³/min (300 usgpm).

Some of the Flygt pumps are equipped with float switches so they can be automatically turned on and off. This protects the pump against dry runs and at the same time regulates the liquid level.

- Compact design
- Light weight
- Easy handling
- Flexible applications

- Liquid manure with straw components
- Milking parlor draining
- Wastewater
- Cellar drainage
- Wastewater
- Sewage
The 4600 series from Flygt can be installed quickly and easily with low capital investment since there is no need for costly catwalks, external transmission, or concrete motor supports. Thanks to the wide range of components and materials and the modular structure of the 4600 mixers, there is a vast range of mixer powers and configurations to choose from.

The body is made of stainless steel for corrosion resistance and long life. Propellers are made of high chrome, duplex or stainless steel.

- high mixing performance with low energy consumption
- solid direct drive
- standard and explosion-proof motor construction
- motors suitable for different temperatures: 40 °C, 70 °C, 90 °C / 104 °F, 158 °F, 194 °F
- explosion proof up to 90 °C / 194 °F, approved by Factory Mutual (FM)
- wide range from 3.3 kW (4.5 hp) to 30 kW (40 hp) units
- new propellers for optimized jet generation

Flygt submersible motor 4600 mixer with support unit
1 **Propeller**  
Three-blade propeller with hydraulically optimized design, self-cleaning properties and highly quiet running. Designed as a thrust propeller to generate a very turbulent flow.

2 **Motor**  
Squirrel-cage induction motors, impermeable to water, with 8 to 16 pole winding for duty type S1 when the motor is submerged. Stator winding with class H insulation (180 °C, 356 °F); maximum of 15 starts per hour; an external overcurrent release as additional motor protection in addition to the integral thermal winding protection (compulsory for explosion proof and recommended for standard motors). Protection type IP 68 in accordance with DIN VDE 0530 Part 5 or as explosion proof model for temperatures up to 90 °C, 194 °F.

3 **Cooling**  
Surface of the motor is cooled by the ambient medium.

4 **Shaft seals**  
Two face seals working separately; safe and long-lasting seal to keep the motor compartment dry. Paired materials: silicon carbide / silicon carbide.

5 **Shaft bearings**  
Robust, permanently lubricated, low-maintenance free roller bearings.

6 **Cable terminal compartment**  
Impermeable to pressurized water; cable entry point is watertight and moisture-proof with strain relief.
System Technology
Cattle Production

**Flushing method with slider**

Slider systems with folding or tilting sliders are best combined with transverse channel flushing.

- Flushing the transverse channel
- Mixing the liquid manure
- Pumping homogeneous liquid manure to the elevated tank

The liquid manure does not get “old”.

- Reduced odors in the stable
**Flushing method**

The flushing method is ideal for shallow liquid manure channels.

- Flushing and mixing the liquid manure
- Pumping to the storage tank

The liquid manure does not get “old”.

- Reduced odors in the stable

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*Flygt discharge connection with guide pipes and guide pipe support*

*Connecting the Flygt pump to the guide pipe support*

*Flygt submersible motor pump at the discharge connection*
System Technology for Pig Production

Plug system with flush

- Flygt flush system in the pigsty
- Draining via a flush
- Flushing with own liquid manure
- Pumping into the storage tank
- Mixing up the storage container with submersible motor mixer
- Pumping off to tank truck via a filling and unloading station
Flushes method

Flygt flushing method in the pigsty:

- Draining via a valve
- Rinsing with own liquid manure
- Pumping off into the storage tank
- Mixing up the storage container with submersible motor mixer
- Pumping off to tank truck via a filling and unloading station
Flexible Technology for Mixing and Pumping

**Two-way mix/pump valve**

- Pumping off the liquid manure from the storage container
- Mixing in the storage container
- Switching the two-way valve with a cable pull above the edge of the container

Heavy mixing in the storage container with the mixer jet of the two-way valve or filling the barrel economically with only one submersible motor chopper pump.

Flygt submersible motor pump on a square mast with the two way mix/pump valve
Submersible mixer for transportable applications

The submersible motor mixer on the 2-wheel chariot is the ideal solution for companies with several manure tanks or for application in several plants.

Flygt chariots solve the problem of liquid manure storage below slatted floors.

- Flexible application
- Useful in narrow hallways
- Rotatable through 360°
- Continuously height-adjustable

Flygt 4640 submersible motor mixer
Pressure Connection System

Plug system with flush

Mixing the liquid manure and filling the barrel with a Flygt pump:

- Mixing up
- Chopping
- Filling the barrel

When the containers are fairly large, a Flygt mixer is used in addition.

Flygt submersible motor pump with mixer jet – tilted out for mixing the container contents

Flygt submersible motor pump in the pressure connection for pumping off the liquid manure or filling the barrel
Pumps and Mixers

in a rectangular tank

- Mixing up the liquid manure with Flygt submersible motor mixers
- The mixed-up liquid manure is pumped off with a Flygt submersible motor pump on the Flygt discharge connection system
ITT Water & Wastewater

A partner with vast experience.
Every sector demands special know-how from its partners. This particularly applies to agriculture. Therefore agricultural engineers are working with us for you. They speak your language and quickly understand you. For the more clearly a company expresses its professional competence, the more appreciable is the focus on the concerns of the customer. Ours are the Flygt submersible pumps and submersible mixers for liquid manure systems and biogas plants.

Here, as in nearly all sectors, demands on the products and the systems alter through economic and environmental changes. The process of development, again and again offering new, better technology, demands stimulus and the ability for product innovation, in order to meet the changing expectations of customers.

Here we benefit from being a subsidiary of a large international company. This has significant advantages for you. A vast support network is available to us and we benefit from intensive exchange of expertise within the entire group of companies. Expertise, which we collect internationally in the operational markets, constantly flows into research, development and production.
Teamwork and knowledge integration expand the basis for quality. In this way we more quickly find new, at times ground-breaking solutions. On this foundation, synergies for systems and products arise and not just for agriculture.

Most of the submersible systems, pumps and mixers used worldwide, are called Flygt. They are brought to use in local authority districts, in industry, in the building sector, in mining, in shipping and offshore technology as well as in agriculture. ITT Water & Wastewater is internationally recognised in all these sectors for commercial products of the highest quality.

Flygt pumps and mixers conform to the highest standards of production worldwide.

But ITT Water & Wastewater stands for more than just product perfection. As founder of submersible technology in 1948 and overall with more than 100 years’ experience ITT Water & Wastewater engineers are equipped with a vast technological know-how in development of products and complete systems. Again and again they prove to be the most economical and reliable solution.

Benchmark for this everywhere is customer satisfaction. For this reason we are constantly seeking proximity to our customers. It sharpens our intuition for the essential: to be your number one choice.
What can ITT Water & Wastewater do for you?

From water supply to mining, sewage systems to construction, and process industries to emergency services, ITT Water & Wastewater solutions are helping our customers solve some of the toughest fluid-handling problems in a safe and cost-effective way.

As a leading supplier of fluid-handling solutions, we have the products and expertise to provide you with complete pumping solutions, from planning and delivery, to installation and after-sales service. With a worldwide service network, you can always get the support you need.

The company is wholly owned by the ITT Corporation of White Plains, New York. It is represented in more than 130 countries and has more than 44 sales companies.

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