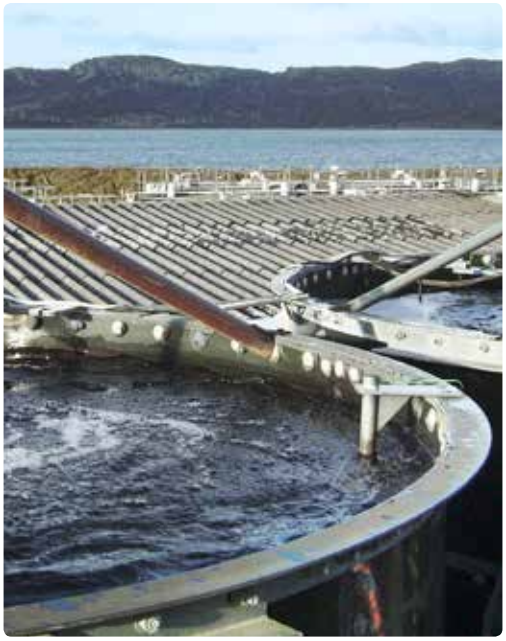
Flygt propeller pumps

AN INVESTMENT IN RELIABLE OPERATION

FLYGT

a xylem brand

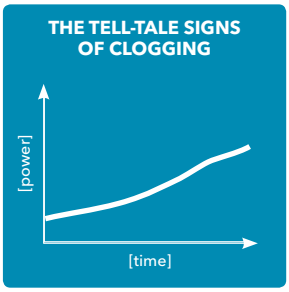
How clean is clean water?



How clean is the liquid you need to pump? Is it completely free of vegetation or fibers, pieces of plastic or clothing, rags or wrappers? Have you ever wondered whether such material might be causing you problems?

How can you tell?

Turning off and inspecting a pump is an inefficient way to check the pumps, as material gets washed off the propellers when the pump is shut-down. There is a simple way to find out if there is a clogging problem: check the pump's power consumption. An increase in power consumption often means that the liquid you are pumping is not as clean as you thought it was.



What is "clean" water costing you?

· High energy bills

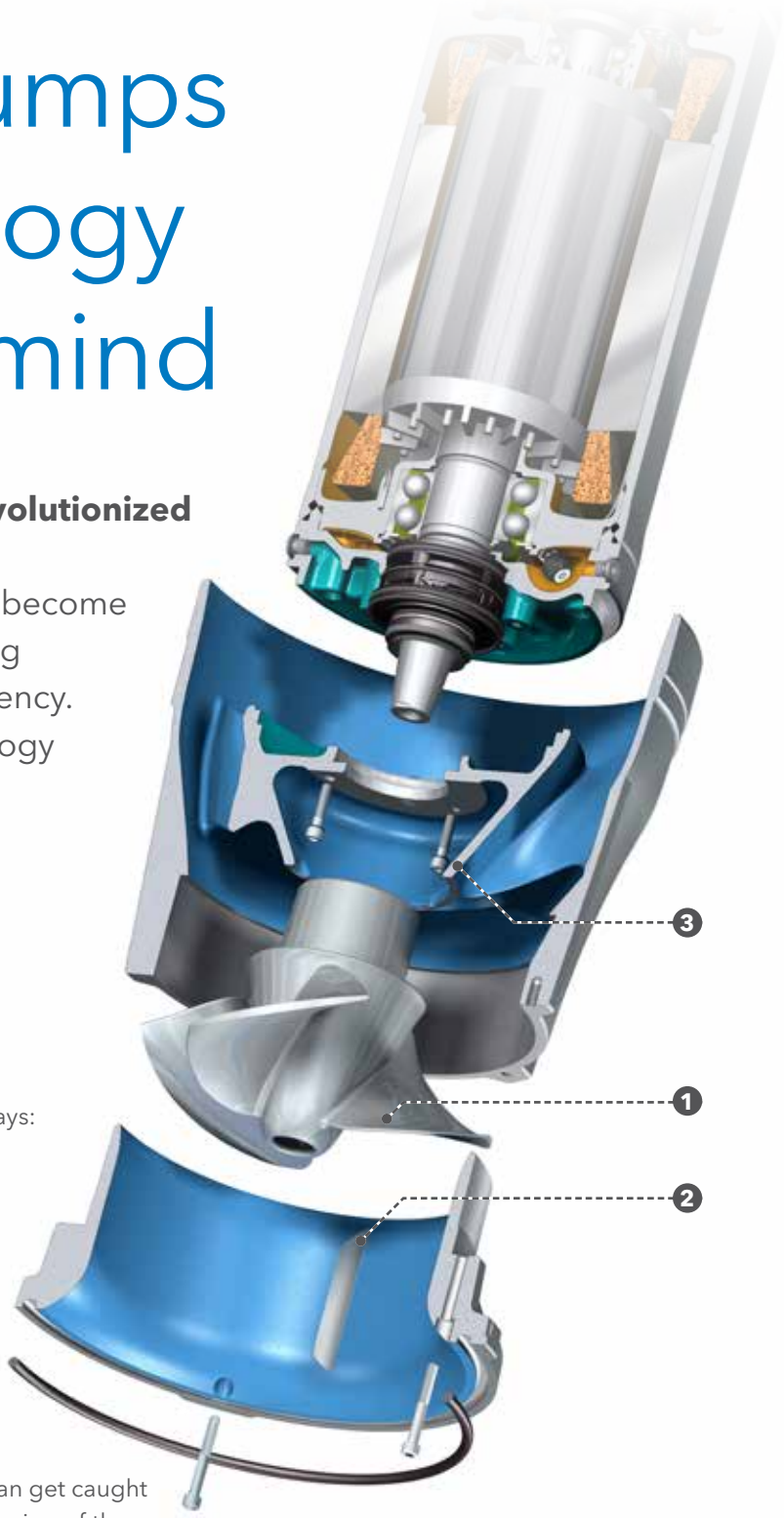
When pumps move huge quantities of water, small decreases in efficiency can result in significant increases in energy consumption.

· Clean-up costs and fines

There is one more risk associated with water that is not clean – pumps can overload. As pumps become clogged, the motors have to work harder, become too warm, and then shut down to prevent overheating. In critical applications such as storm-water pumping, unexpected stoppages can have serious and expensive consequences.

Propeller pumps + N-technology = peace of mind

Flygt self-cleaning N-technology revolutionized wastewater handling in 1997.
Over 300, 000 installations later, it has become the global benchmark for non-clogging performance and sustained high efficiency. Flygt propeller pumps offer N-technology for reliable pumping of high volumes at low heads.



How it works

N-technology reduces the risk of clogging in three ways:

1. The leading edge of the propeller blades has a radical swept-back design. This ensures that plastic bags, fibers, clothing and other material slide down the leading edge of the propeller blades out toward the pump housing.

2. The relief groove forces the material through and out of the pump.

3. In conventional propeller pumps stringy material can get caught on the guide-vanes. With N-technology, the special design of the guide-vanes creates local turbulence around any accumulated material helping remove it from the vanes, after which it gets discharged from the pump.

Together, these features add up to high reliability and low operational costs, year after year.

- **Lower energy costs**
- **Fewer stoppages**

Flygt = Innovation

The name Flygt has been synonymous with innovation from the early 1920s. In 1947, Sixten Englesson, the company's head engineer, developed the world's first submersible drainage pump. It was an invention that came to revolutionize the mining and construction industries. This has been followed by a long list of industry firsts – below, a small selection.

1947
World's first submersible drainage pump

1956
First submersible wastewater pump

1977
Launch of first submersible propeller pump

1997
Unveiling of N-pump technology

2012
Launch of slimline PL propeller pumps

CASE STUDY;
ELIMINATING STORM-WATER FLOODING

THE CHALLENGE
Following heavy rainfall, overflowing of a storm-water canal, Gran Canal, in Mexico City was becoming a recurring problem. This was because the water was contaminated with plastic bags, rags and other waste, which were clogging up the existing pumps and preventing them from working at their intended capacity.

THE SOLUTION
Xylem was awarded the contract to design and construct a large storm-water pump station. An important part of the Flygt solution included a custom-made station with excellent flow conditions for the pumps, despite the compact dimensions dictated by site limitations.

THE RESULT
Seven PL propeller pumps were installed with a capacity of 333,000 gpm (21m³/s). To handle the large quantity of debris, the pumps were equipped with N-technology. Since commissioning in 2008, flooding has been eliminated and there have been no reported incidents of clogging.

What's in it for you?

There's a simple reason why submersible pumps are being used in increasing numbers around the world. Operating submerged, and out of the way, no superstructure or dedicated dry pit is required. And this means significantly lower construction costs.

Cost efficient
- Motor and hydraulics integrated in a compact unit
- Column pipe installation

Easy to install and service
- No assembly or shaft-alignment
- Installed within minutes
- Easy to hoist for service

Reliable
- No need for transmission shafts, couplings or intermediate bearings
- Great reliability and high operational efficiency

Invisible and silent
- Operating submerged, pumps are invisible
- Surrounded by fluid, Flygt pumps are virtually silent

Flood and storm
High operational reliability is key, especially since storm-water often contains solids and long fibrous material.

Treatment plant effluent
Minimizing downtime is essential for treatment plants – Flygt Propeller pumps with N-technology provide reliable 24-hour-a-day operation in low-head applications containing sludge and effluent.

Raw water intakes
Even when operated 24 hours a day, Flygt pumps can provide factory-new efficiency over the long-term thanks to N-technology.

Theme and water parks
Flygt propeller pumps offer an attractive combination of low energy consumption, high reliability and global aftermarket support.

Anything from 1,500 GPM to over 100,000 GPM

Flygt propeller pumps are designed for pumping large volumes at low heads. Because they are optimized to pump within this range, they provide a cost-effective alternative to conventional vertical turbine pumps.

Pumping anything from 1,500 to 100, 000 GPM (100 to 7,000 liters per second), our portfolio of pumps gives you a wide range from which to select.

Robust and reliable
Every Flygt propeller pump is tested before leaving our factory to ensure high performance and quality. Flygt propeller pumps deliver solid cost-effective performance for more than 40 years in applications such as:

- Storm-water
- Wastewater treatment plant effluent
- Return activated sludge
- Water intakes
- Flood control
- Irrigation
- Amusement park attractions
- Surf riders
- Aquaculture

CASE STUDY;
COUNTERING LOW RIVER LEVELS

THE CHALLENGE
Following periods of extended drought, the water and power utilities along the Missouri River were concerned that cooling water intakes were being threatened by low river levels, rendering the cooling water pumps inoperable.

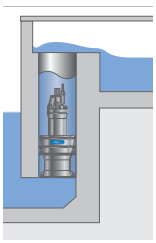
THE SOLUTION
Acting on an emergency basis, a USD 2 million low-river pump system was authorized. Four Flygt propeller pumps were installed in a new intake structure, each with a rated capacity of 17,000 gpm (1,100 l/s). The pumps were supplied with Flygt N-technology to prevent any stringy debris from causing clogging.

THE RESULT
To ensure adequate quantities of cooling water to the pumps during low river flows, the Flygt propeller pumps operate continuously during extreme, low-level river conditions. The system has proven itself on numerous occasions and similar projects to safeguard the raw water supply along the Missouri are under consideration.

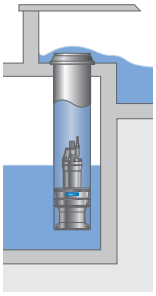
Six ways to install Flygt PL pumps
Flygt discharge components can be combined in many configurations to match different pump station layouts:

- Free-hanging steel column or cast in concrete
- Open top or side outlet
- Optional water-tight cover and power cable entry for pressurized discharge
- Water tight cover, siphon system or horizontally in a pipe

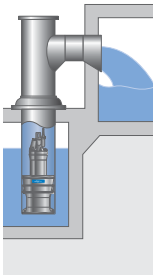
Lean and fit – Flygt slimline propeller pumps
The slim profile of these Flygt propeller pumps means that they can be installed in smaller column pipes. Since the pump bay width is determined by the column pipe diameter, the pump station footprint can therefore be reduced. The smaller the station, the lower the cost for excavation, material and labor. Yet despite their slim dimensions, these pumps give you the heavy-duty reliability and superior performance.



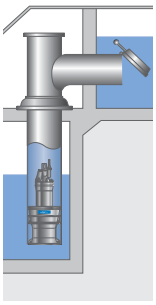
In concrete structures: For pumping to channel. No check valve is required.



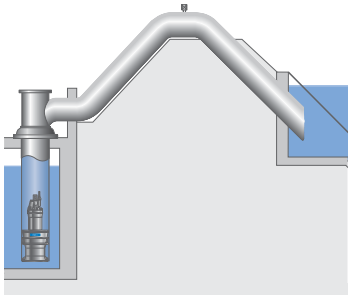
In manufactured columns: For pumping to channel. No check valve is required.



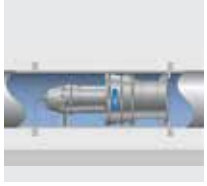
With a discharge pipe and free outlet.



With submerged outlet and flap valve.



With a siphon.

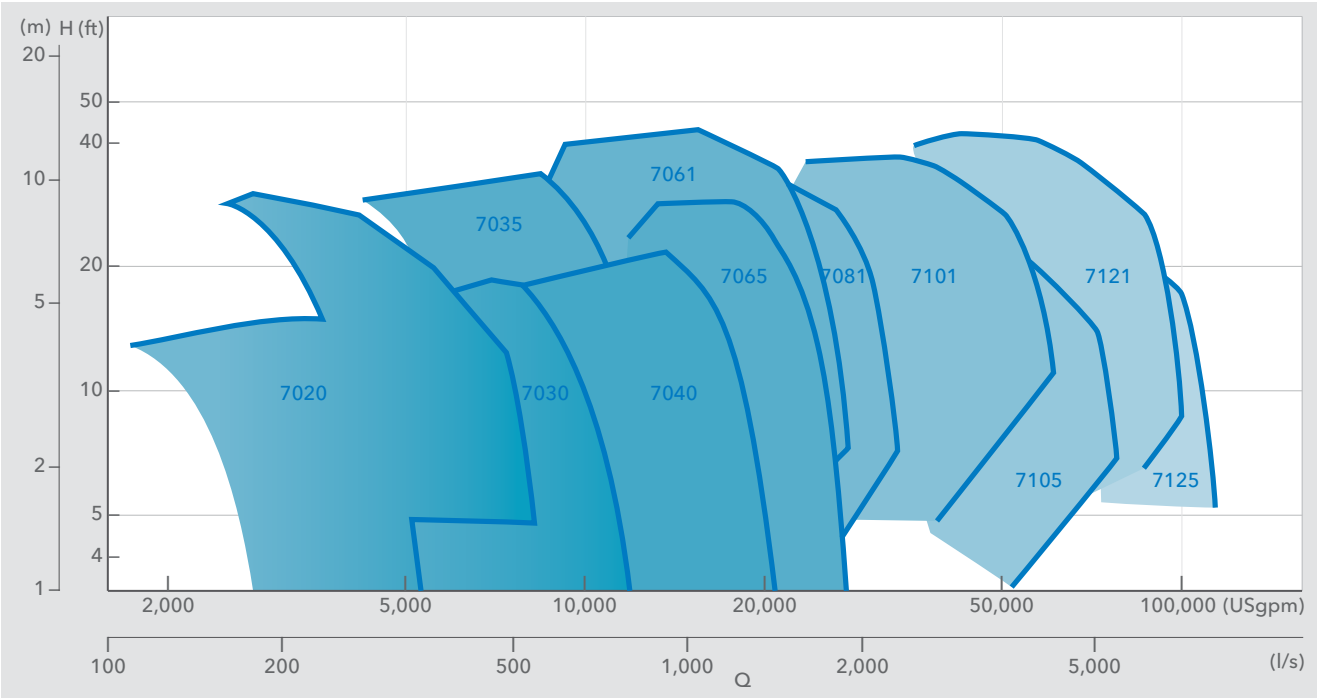


Horizontally in a pipe.

PL pumps – low head, very high flow

With their huge capacity and low power consumption Flygt PL pumps are ideal for moving large volumes at low heads. N-technology reduces the risk of fibrous material building up on the pumps, resulting in sustained efficiency over the long-term.

Performance 60 Hz

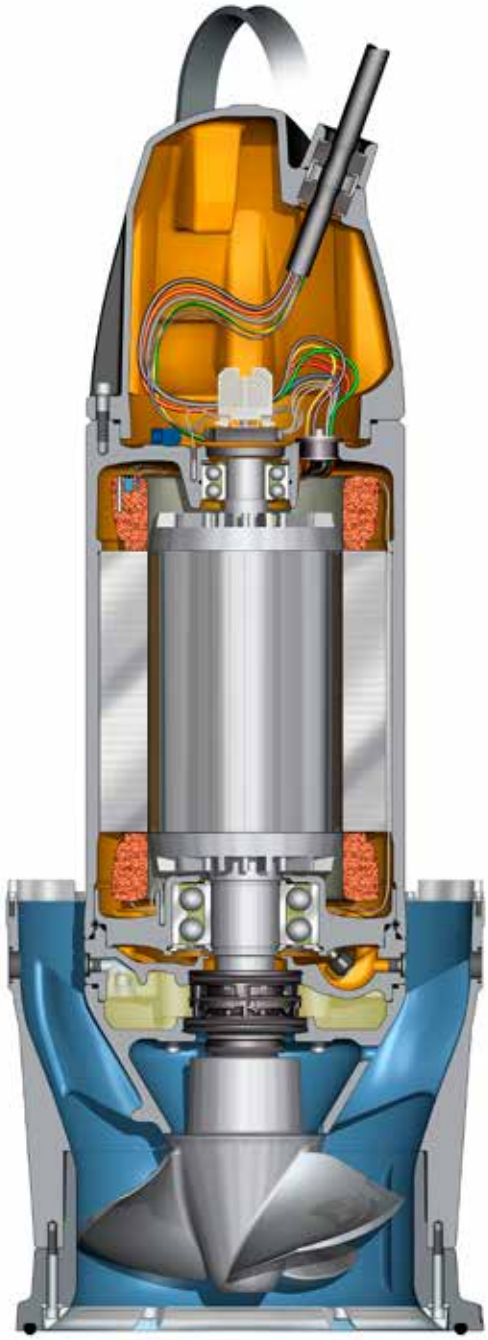


Class H (180°C/355°F) insulated motor – greater reliability

- All motors are fully submersible
- Explosion-proof versions for use in hazardous environments
- Heavy duty bearings provide extended operational lifetime

Unique seals – extra safety

- Flygt mechanical seal systems minimize shaft overhang, while maximizing cooling and lubrication
- Two pairs of mechanical shaft seals work independently for double safety
- The Flygt Active Seal™ system offers increased seal reliability and zero leakage into the motor, therefore reducing the risk of bearing and stator failure
- An extra level of safety is provided by a double-grommet cable sealing



Sensors – pump protection

- Thermal sensors prevent overheating
- Pt100 sensors monitor stator and bearing temperatures
- Leakage sensor(s) alarms you to detect liquid intrusion through cable or seal
- A vibration sensor warns against abnormal conditions

Reliable and efficient hydraulics

- N-technology ensures maximum reliability and sustained high efficiency
- Pump suction is sealed with a replaceable rubber seal
- Pump hydraulic performance includes all losses (including pump column losses) up to at least 20 inches (500 mm) above the top of the motor

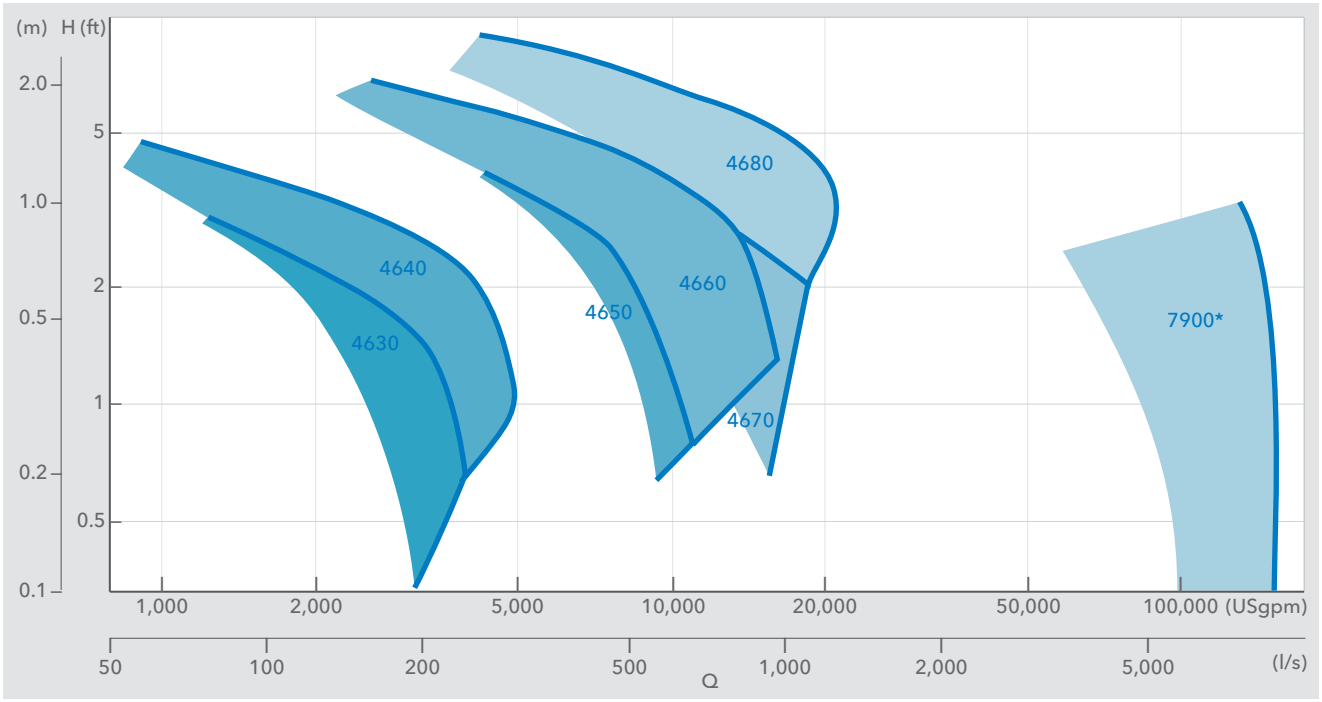
Data 60 Hz

Model	Motor power		Propeller	Propeller	Column Ø	
	hp	kW	Material	Self-cleaning	in	mm
PL 7020	27–40	20–30	SS (Stainless Steel)	Standard	16	400
PL 7030	26–65	19–48	SS	Standard	20	500
PL 7035	90–150	67–112	SS	Standard	22 or 24	550 or 600
PL 7040	40–145	30–108	SS	Standard	24	600
PL 7061	70–240	52–179	Al-Bronze or SS	Optional	32	800
PL 7065	45–215	34–160	SS	Standard	32	800
PL 7076	40–65	30–48	Cast iron	N / A	40	1,000
PL 7081	65–250	48–160	Al-Bronze or SS	Optional	40	1,000
PL 7101	90–355	67–265	Al-Bronze or SS	Optional	48	1,200
PL 7105	135–400	101–298	SS	Standard	48	1,200
PL 7121	310–775	231–578	Al-Bronze or SS	Optional	56	1,400
PL 7125	385–600	287–447	SS	Standard	56	1,400

PP pumps – ultra-low head, high flow

High capacity and easy installation Flygt PP pumps are ideal for moving large volumes at very low heads. The back-swept propeller and shaft shield reduce the risk of fibrous material building up, resulting in sustained efficiency over the long-term.

Performance 60 Hz



* Additionnal capacity available. Consult your local Applications Engineer.

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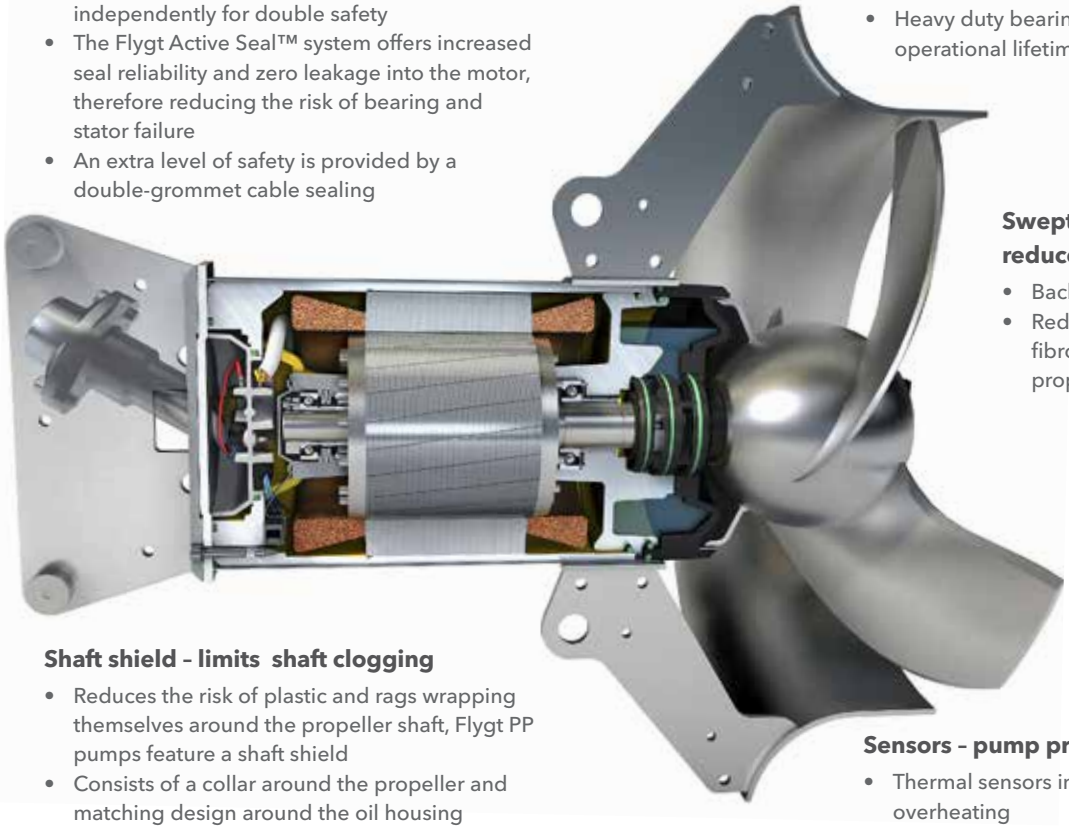


Swept-back propeller – reduces clogging

- Back-swept leading edge design
- Reduced risk of plastic and fibrous materials clogging the propeller

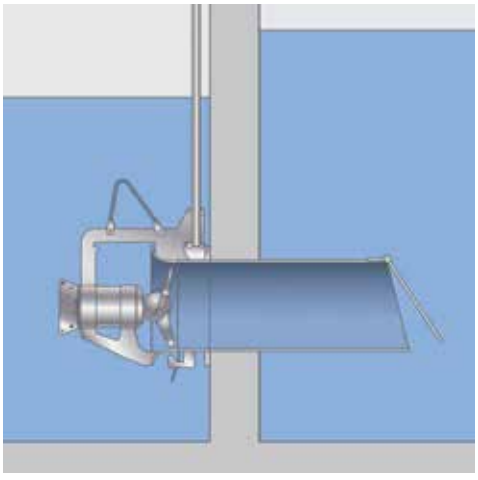
Shaft shield – limits shaft clogging

- Reduces the risk of plastic and rags wrapping themselves around the propeller shaft, Flygt PP pumps feature a shaft shield
- Consists of a collar around the propeller and matching design around the oil housing
- Creates local flow patterns which help keep fibers away from the shaft

Sensors – pump protection

- Thermal sensors in the stator windings prevent overheating
- Leakage sensor(s) alarms you to liquid intrusion through cable or seal

Easy installation

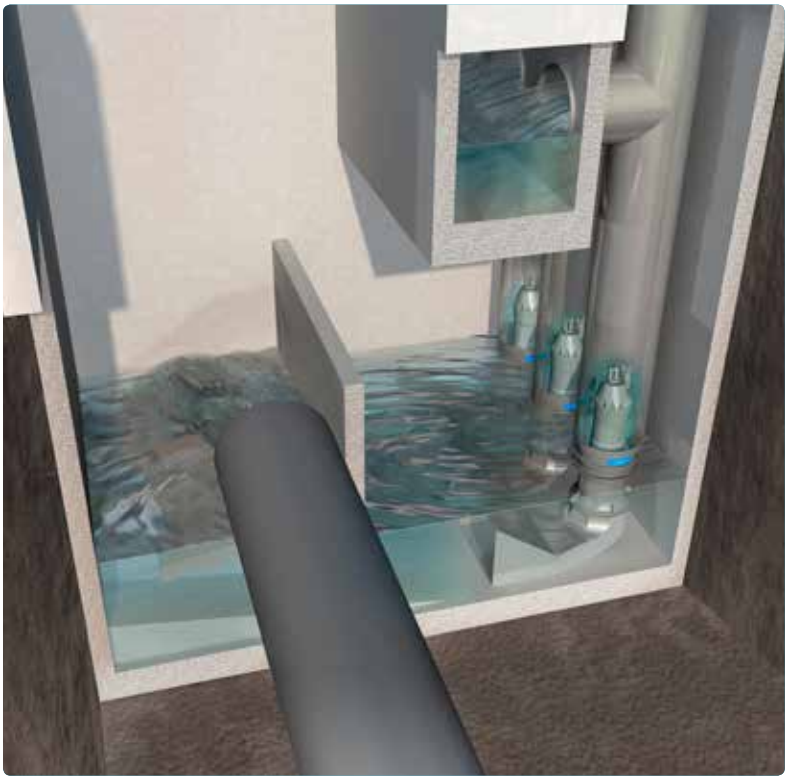


Flygt 4600 propeller pumps are designed for cost-effective installation. Just lower them down the guide-bars and the pumps automatically mate with the discharge connection.connection.

Data 60 Hz

Model	Motor power		Propeller	Discharge Ø	
	hp	kW	Material	in	mm
PP 4630	2.5	1.9	Stainless steel	16	400
PP 4640	4	3	Stainless steel	16	400
PP 4650	6–8.3	4.5–6.2	Stainless steel	24	600
PP 4660	11–15	8.2–11.2	Stainless steel	24	600
PP 4670	20	14,9	Stainless steel	32	800
PP 4680	30–40	22–30	Stainless steel	32	800
PK 7900	85–170	63–127	Cast iron	89	2,250

Why station design is crucial



- Reduces the construction and installation costs up to 50%
- Ensures uniform approach flow to the pumps to achieve optimum pump performance and maximize the pump life
- Prevents accumulation of sediment and surface scum in the sump
- Helps reduce the operating costs with effective planning and operation schedules
- Predictive design principles enable convenient access to equipment and easy removal for schedules maintenance

Pump system engineering know-how
With over 2 million Flygt pump stations in service worldwide, we have extensive knowledge of pump station design and operation, and a profound understanding of the importance of fluid dynamics.

Over the years, we have accumulated considerable practical experience in designing, commissioning and maintaining propeller pumping systems. Flygt sump designs minimize the risk of adverse hydraulic conditions and help ensure reliable operation. Our experts can help optimize performance and lifetime of your station.

Contact your local Applications Engineer for:

- Pump selection
- Creative installation solutions
- System analysis and head loss calculations
- Sump design
- Water hammer calculations
- Pump-start analysis
- Computational Fluid Dynamics (CFD)
- Physical pump sump scale-model testing

Whatever the undertaking, our ultimate goals are reliable, trouble-free pumping and energy-efficient operation.

CASE STUDY;

HOLDING BACK THE MISSISSIPPI

THE CHALLENGE

Established in 1750, the historic town of Ste. Genevieve, an hour south of St. Louis, was the first permanent European settlement in Missouri. For many years it had suffered from repeated floods from the Mississippi, the sixth largest river in the world in terms of discharge, with an annual average flow rate of 500,000 FT^3/s (14,000 m^3/s).

THE SOLUTION

Demanding tender specifications from the Army Corps of Engineers included net positive suction testing to avoid cavitation. The final specifications included three submersible propeller pumps that could obtain flow rates of 75,000 gpm (4,700 l/s) at a total dynamic head of 25.6 feet (7.8 m). The pumps were integrated in the existing levee.

THE RESULT

A key purchasing factor for the Army Corps in selecting Flygt submersible pumps was the method of installation, which facilitates maintenance. For the first time in its 250-year history, Ste. Genevieve, which contains some of the most important French Colonial structures in North America, is now protected from flooding.

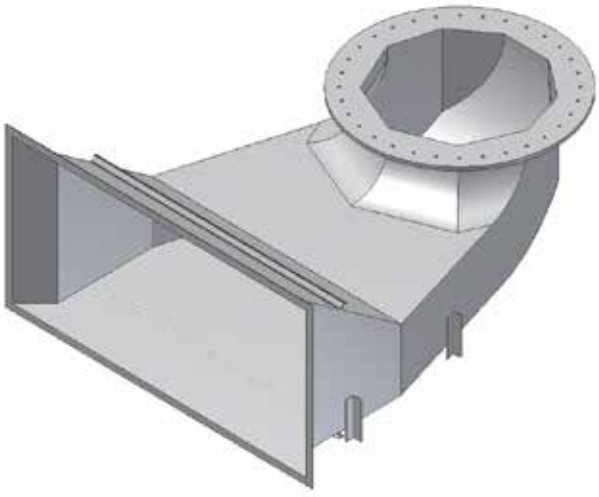
Easier, faster and safer handling

Suction intake
For the most challenging inflow conditions, the Flygt Patented Formed Suction Intake (FSI) ensures proper inflow to the pump suction. The FSI is placed directly underneath the pump and can be constructed in concrete or from prefabricated sheet metal.

Cable handling solutions
The power and signal cables that are needed to operate submersible propeller pumps are positioned inside the discharge column. Here they are exposed to high liquid velocity and strong turbulence – particularly close to the sides of the column – where they risk premature damage.

Xylem offers a number of different solutions that keep the cables secured to the lifting chain in the center of the column where the movement of liquid is least turbulent. Our experts can help you select the right solution for your installation.

Pump installation and retrieval
Propeller pumps are simple to install and to retrieve because they sit on the pump seat without having to be bolted into place.



More intelligence, more peace of mind

At Xylem, we offer all the hardware and software for complete monitoring and control solutions – from intelligent pump controls, starters and sensors, to system supervision, including SCADA systems.

Optimize your pumping
With Flygt monitoring and control products, you can manage and optimize the performance of every component in your system. This helps reduce stress on pumps, valves and mains, helping to prolong equipment lifetime, increase efficiency and boost reliability.

Monitoring and control
Flygt monitoring and control systems are designed for use in a variety of different pumping applications.

Whether it's a matter of wastewater, storm water, effluent, RAS, WAS, lightly contaminated or clean water, we can help guide you to find the right solution for your needs.

Xylem TotalCare is a comprehensive, integrated portfolio of services designed to ensure that your water and wastewater equipment keeps running at its best.

Our portfolio comes backed by deep systems knowledge and expertise in water and wastewater applications. Xylem TotalCare gives you operational security and more time to focus on your core business.

PREVENT REPAIR XYLEM TOTALCARE SERVICES OPTIMIZE SAVE

We take pride in our ability to help customers overcome challenges and optimize operations by providing the right solution for every specific application.
Find out more about our TotalCare concept at **xyleminc.com/totalcare**

FB034-1921 • Flygt propeller pumps • 01/2015 • US

About Flygt

Flygt, a Xylem brand, is synonymous with engineering excellence, reliability and closeness to customers. Flygt is a world leader in the design and manufacture of dry and submersible pumps, mixers and related intelligent controls systems. Under the Flygt banner, customers have access to a complete range of products, services and solutions for moving water and wastewater, as well as advanced monitoring and control equipment to optimize operations. Product development and manufacturing of Flygt products is based in Sweden. For more information about Flygt products, please visit **www.flygt.com**

Xylem ['zīləm]

1) The tissue in plants that brings water upward from the roots
2) A leading global water technology company

We meet the world's water needs by creating innovative solutions that improve the way water is used, conserved, and re-used. We move, treat, analyze, and return water to the environment. In more than 150 countries, our loyal customers know us for our powerful combination of leading product brands and applications expertise.

For more information on how Xylem can help you, go to **www.xyleminc.com**

xylem
Let's Solve Water

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