



Flygt hydro turbines

SMART AND COMPACT HYDROPOWER

60 Hz

FLYGT
a xylem brand

Why submersible?

In 1983 the first Flygt submersible turbine was installed in Sweden. Since then we have delivered over 350 turbines around the world. Most of these units are still in operation as of today.



As the largest submersible pump manufacturer in the world, our experience and history is placed into every submersible turbine we manufacture. Installed in new hydro plants or existing structures such as old mill sites, submersible turbines are extremely adaptable and can be made to work at almost any site. With low initial investment cost and long lifetime, the return on investment in small scale hydro is short, which leads to good profitability.

There's a simple reason why submersible turbines are chosen. Operating submerged, and out of the way, no expensive superstructure is required.

Easy to install and service

Flygt submersible turbines can be installed in minutes, no assembly or shaft alignment needed. Flygt smart installation concepts allow easy removal for servicing.

Reliable and efficient

Submersible turbines offer high operational efficiency and great reliability, no transmission shaft, couplings or intermediate bearings.

Invisible and quiet

Submerged operation and below ground installation make Flygt turbines virtually silent and invisible.



1947

World's first submersible drainage pump



1956

First submersible wastewater pump



1977

Launch of first submersible propeller pump



1983

Launch of Flygt submersible turbines



1985

Introduction of automatic adjusting runners

Most common Flygt turbine installations

Penstock

Intake siphon

Open or covered flume with cylindergate

Traditional open or covered flume

Submerged underwater chamber

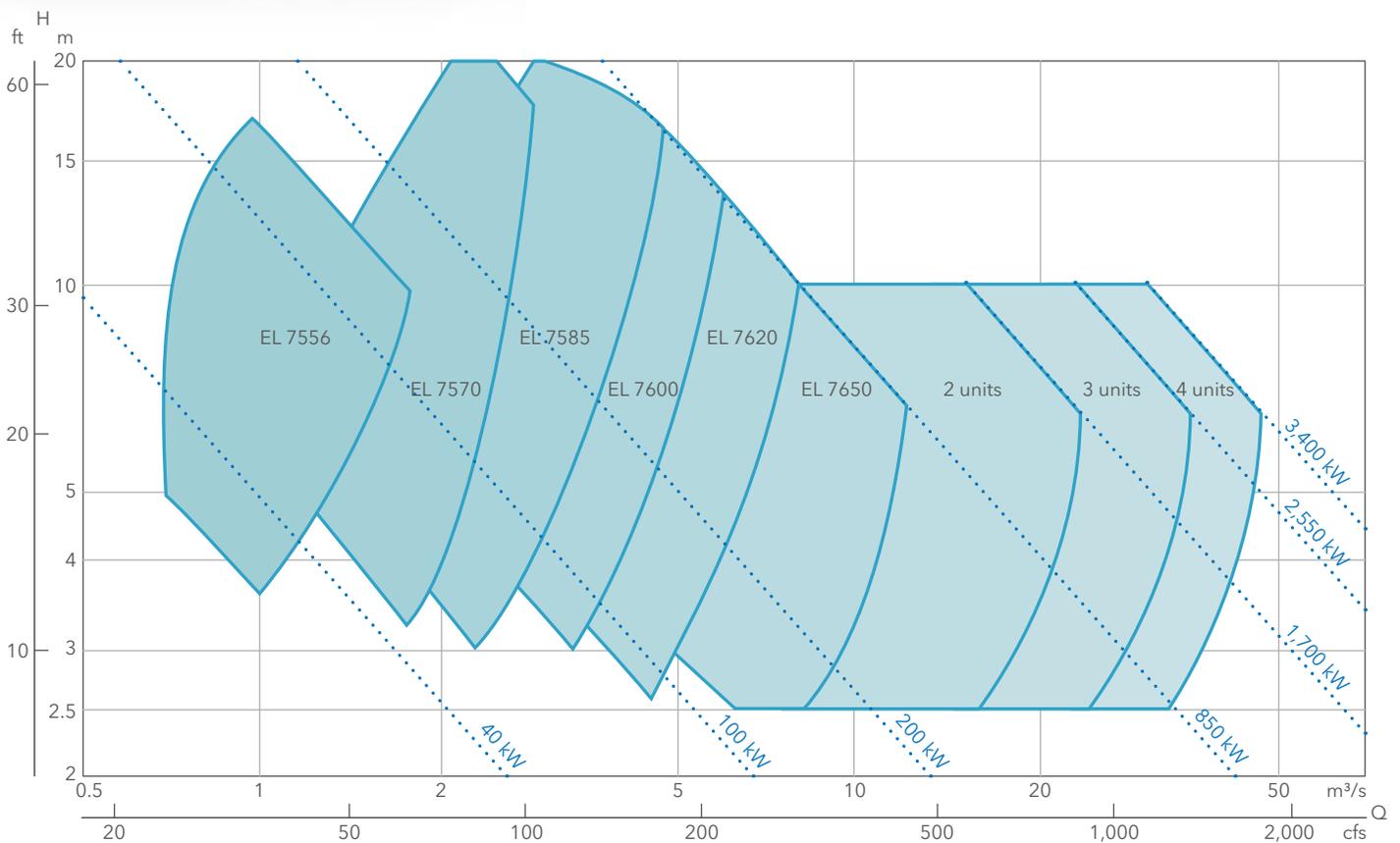


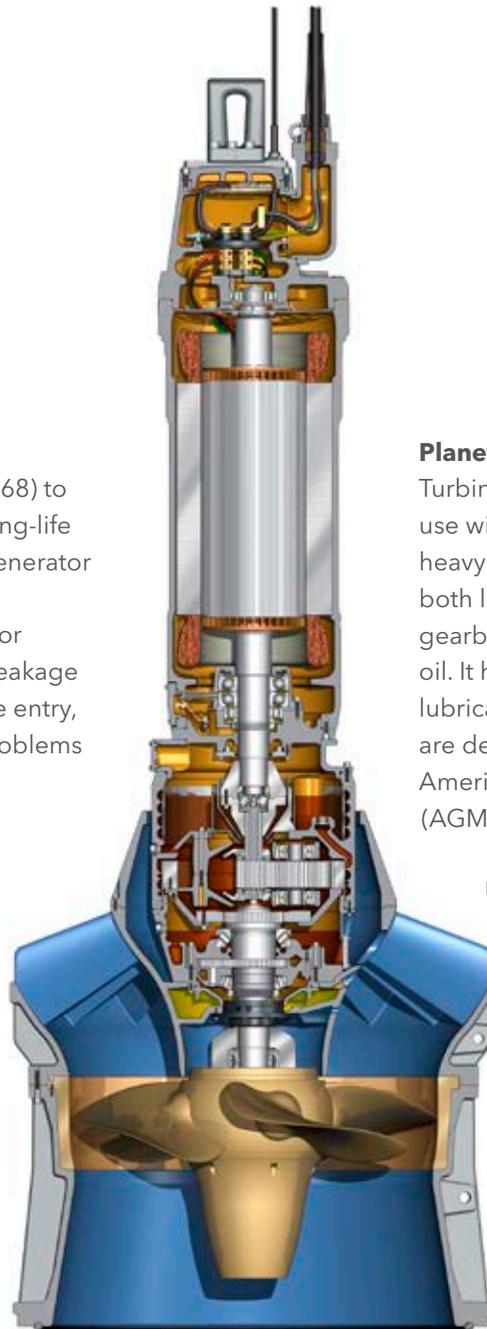
Designed to run and adapt

Usable in applications with heads up to 65 feet (20 m) and flows up to 350 cfs (10 m³/s) per unit, a wide variety of site conditions can be accommodated by our family of turbines.

Auto-adjusts to varying flow

The four largest available turbines offer an option with automatically adjustable runners (semi-Kaplan turbines) to handle varying flows and use in run-of-the-river conditions.





Generator

All generators are fully submersible (IP68) to a depth of at least 20 meters (65 ft). Long-life bearings as well as class H insulated generator provide extended operational lifetime.

With temperature sensors in the stator winding and main bearing, as well as leakage sensors in the stator housing and cable entry, the generator can be monitored for problems early, before they become severe.

Hydraulics

The runners are available with four or five blades and are available in either aluminum bronze or stainless steel. The blade angle can be manually set in 1 degree increments.

Four or five different fixed guide vane angles are available to provide optimal performance over a wide range.

An easily replicable wear ring in aluminum bronze or stainless steel will maintain high efficiency.

Planetary Gearbox

Turbines that require a speed increaser for use with a generator are equipped with a heavy duty planetary gear box designed for both long life and high efficiency. The gearbox is lubricated and cooled with gear oil. It has a pressurization system for lubrication, filtration and cooling. The gears are designed for infinite life according to the American Gear Manufacturers' Association (AGMA) standards.

Unique seals - adding to reliability

Flygt mechanical seal systems minimize shaft overhang, while maximizing seal cooling and lubrication. Two pairs of mechanical shaft seals work independently for double safety. An extra level of safety is provided by a double-grommet cable sealing.

Model	Power kW	Guide vane angles	Column Ø in (m)	Propeller Ø in (m)	No. of blades	Blade angles	Blade adjustment	Max weight lbs (kg)
EL 7556	40-170	50°, 57°, 63°, 70°	32 (0.8)	22 (0.55)	4 or 5	8° ~ 28°	Fixed	3,800 (1,700)
EL 7570	40-430	50°, 57°, 63°, 70°, 77°	48 (1.2)	28 (0.7)	4 or 5	8° ~ 28°	Fixed	8,900 (4,000)
EL 7585	110-850	50°, 57°, 63°, 70°	48 (1.2)	34 (0.85)	4 or 5	8° ~ 28° 4° ~ 32°	Fixed Automatic*	15,900 (7,200)
EL 7600	110-700	50°, 57°, 63°, 70°	56 (1.4)	40 (1.0)	4 or 5	8° ~ 28° 4° ~ 32°	Fixed Automatic*	17,200 (7,800)
EL 7620	110-700	50°, 57°, 63°, 70°	64 (1.6)	48 (1.2)	4 or 5	8° ~ 28° 4° ~ 32°	Fixed Automatic*	19,400 (8,800)
EL 7650	170-700	57°, 63°, 70°, 77°	80 (2.0)	60 (1.5)	4	8° ~ 28° 4° ~ 32°	Fixed Automatic*	25,200 (11,400)

*) Automatic propeller blade adjustment is only available on 4 Bladed Propellers.

Engineering made easy



Flume and cylinder gate

The flume is narrow in order to optimize the flow of water into the turbine. In the simplest of installations a cylinder gate is placed over the inlet bellmouth. The cylinder gate is balanced and closes by gravity. It also prevents the creation of vortices and allows low flume water depths. A rubber seal ensures a tight gate seal.

The unit and seat

The submersible turbine-generator is a completely integrated machine, including gearbox if required.

As the generator is submerged, it is cooled by the water flowing around it. This allows for efficient and reliable operation.

The turbine rests on and seals against a bottom seat. The turbine is held in place by its own weight and the water pressure while running. An anti-rotation device prevents the turbine from rotation if a shockload should occur.

Easy installation

The turbine is not bolted into the structure. It is simply lowered down into the turbine seat for installation. It can easily be raised for inspection and service.

Draft tubes

Prefabricated elbow or straight conical draft tubes recover dynamic energy downstream of the runner. Each turbine size has a matched draft tube to maximize the energy recovery.

Smooth operation ensured

Xylem TotalCare is a comprehensive, integrated portfolio of services designed to ensure that your water and submersible turbine equipment keeps running at its best. Our knowledgeable and skilled engineers are experts in turbine applications.



Aftermarket support

Flygt provides complete installation, operation and maintenance manuals for every product, including submersible turbines.

Regular maintenance contracts can help ensure that the maximum power is generated by the turbine. They can be setup to ensure that the turbine is installed at the times when it would generate the most power.

Engineering support

Flygt offers detailed drawings for each size of draft tube required. This reduces design time and eases construction. Available in CAD format, they can be placed into construction drawings or given to local fabrication shops to allow construction near the project site, reducing costly shipping charges.

Turbine optimization

Each turbine site is unique. Flygt tools help optimizing the selection of turbines based upon the information for your specific site.

Using the flow duration curves, as well as the site layout, Flygt recommend the number, size, and type of turbines that should be used. This helps ensuring optimal power generation. Flygt also offer CFD (Computational Fluid Dynamics) to ensure proper hydraulic conditions are present for the turbines, and recommend solutions to correct any adverse conditions found.

Generator monitoring

With the use of the MAS (Monitoring And Status) system, the generator can be monitored remotely. With monitoring of temperature, leakage and vibration maintenance can be planned for during the low flow season. Using Modbus serial communication, the MAS can send data to almost any SCADA system used at your site.

With a service network spanning 150 countries, we might have a workshop close to your site that can support you with maintenance, repair, spare parts and more.

We take pride in our ability to help customers overcome challenges and optimize operations by providing the right solution to every specific application.

Find out more about our TotalCare concept at xylem.com/totalcare



Xylem ['zīləm]

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

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



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