Horizontal propeller pumps

For high flow and ultra-low head

FLYGT
a xylem brand

Lateral thinking

When moving very large volumes of fluid over comparatively short distances, common sense poses the question: 'why raise the water only to discharge it again into another basin?'. This arises for instance in wastewater treatment plants where Biological Nutrient Removal through recirculation is increasingly common. Similar situations occur in aquaculture and industry.

Transferring liquids through the walls of a basin rather than up and over it is more efficient. Flygt's 4600 range of, propeller pumps, generating high flows at ultra-low head, are installed to maximize system efficiency. These pumps are specially designed and purpose-built for such applications.

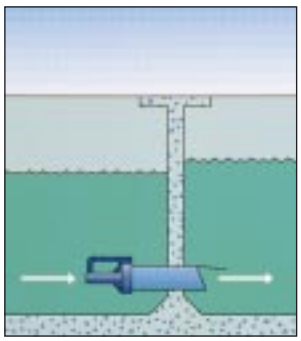
The shortest distance between two points

In, Biological Nutrient Removal (BNR) processes large volumes of fluids are recirculated constantly. The volume of the recirculated flow may in certain cases be up to five times the inflow to the plant. For optimal system efficiency, this continuous steady flow from basin to basin with a level difference as low as 0.1 m requires a different kind of pumping solution.

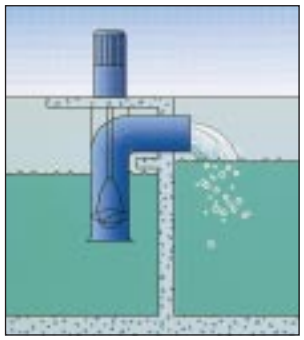
Lower costs, better fluid dynamics

Before the introduction of horizontal propeller pumps in this application, many systems featured conventional pumps, installed in specially constructed sumps, with all the associated civil engineering costs, resulting also in pumping heads of one metre or more. Considering the continuous operation of BNR processes, this represents a year-round battle against the forces of gravity, financed by the municipal authority or company managing the treatment plant.

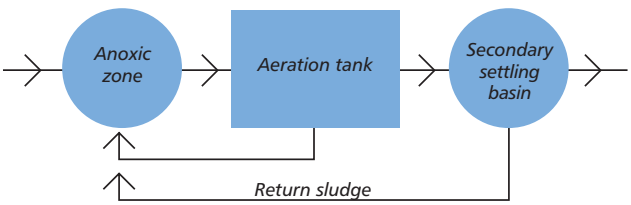
The 4600 horizontal propeller pumps need no special sumps. In new construction their use dramatically reduces civil engineering costs. In existing tanks, the propeller pumps can be installed quickly and economically, operating through a hole between the tanks or through a submerged pipe. Low lift, continuous flow, low system hydraulic losses and optimal pumping duty points result in the best economical solution.



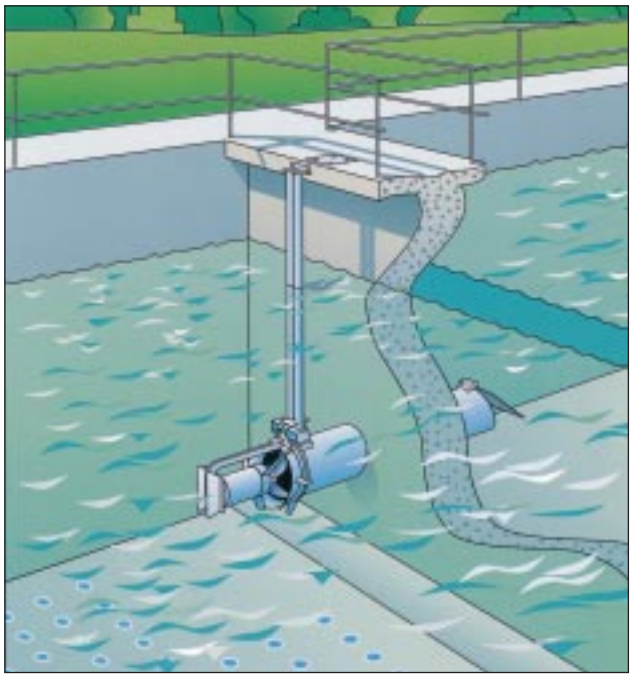
With low head, high volume Flygt 4600 propeller pumps, installation is simple. The pump is mounted in front of a hole in the retaining wall between two basins, or in front of a transport pipe. A non-return valve stops back flow during maintenance or pump stoppage.



Conventionally pumps are dry or wet installed in a specially constructed sump between the basins. This involves separate civil engineering costs, wastes space and results in large volumes of fluids being raised unnecessarily.



Recirculation common to denitrification processes involves large volumes pumped at very low head. System losses are minimized and energy is saved by using low lift pumps.

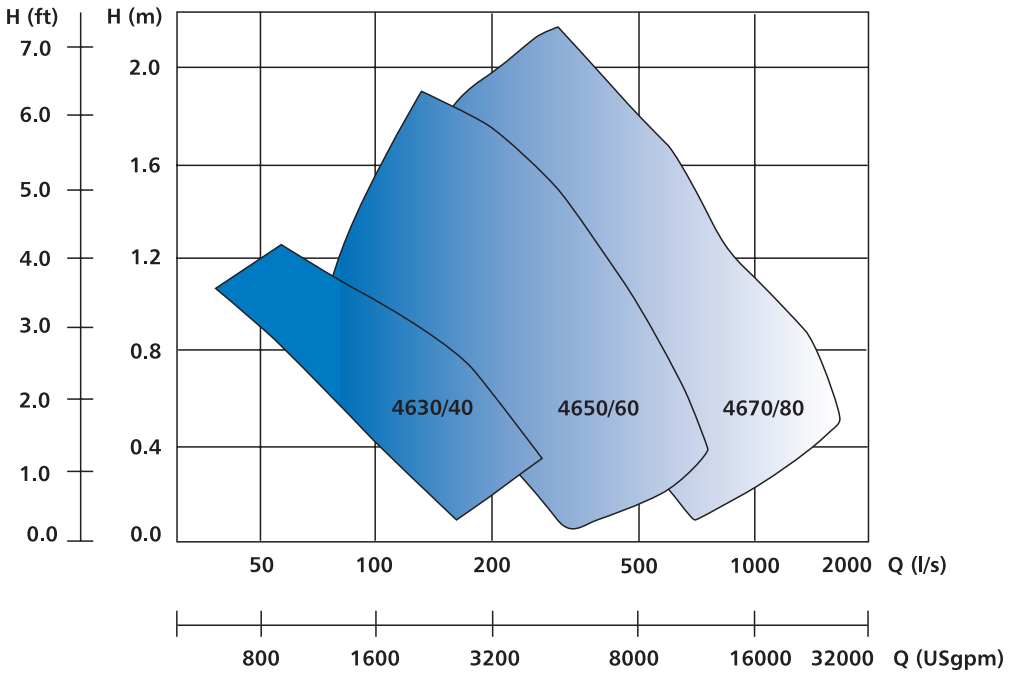


Flygt 4600 propeller pumps are designed for cost-effective installation. The pumps are simply lowered on guide bars to connect with the discharge connection.

A complete range for any requirement

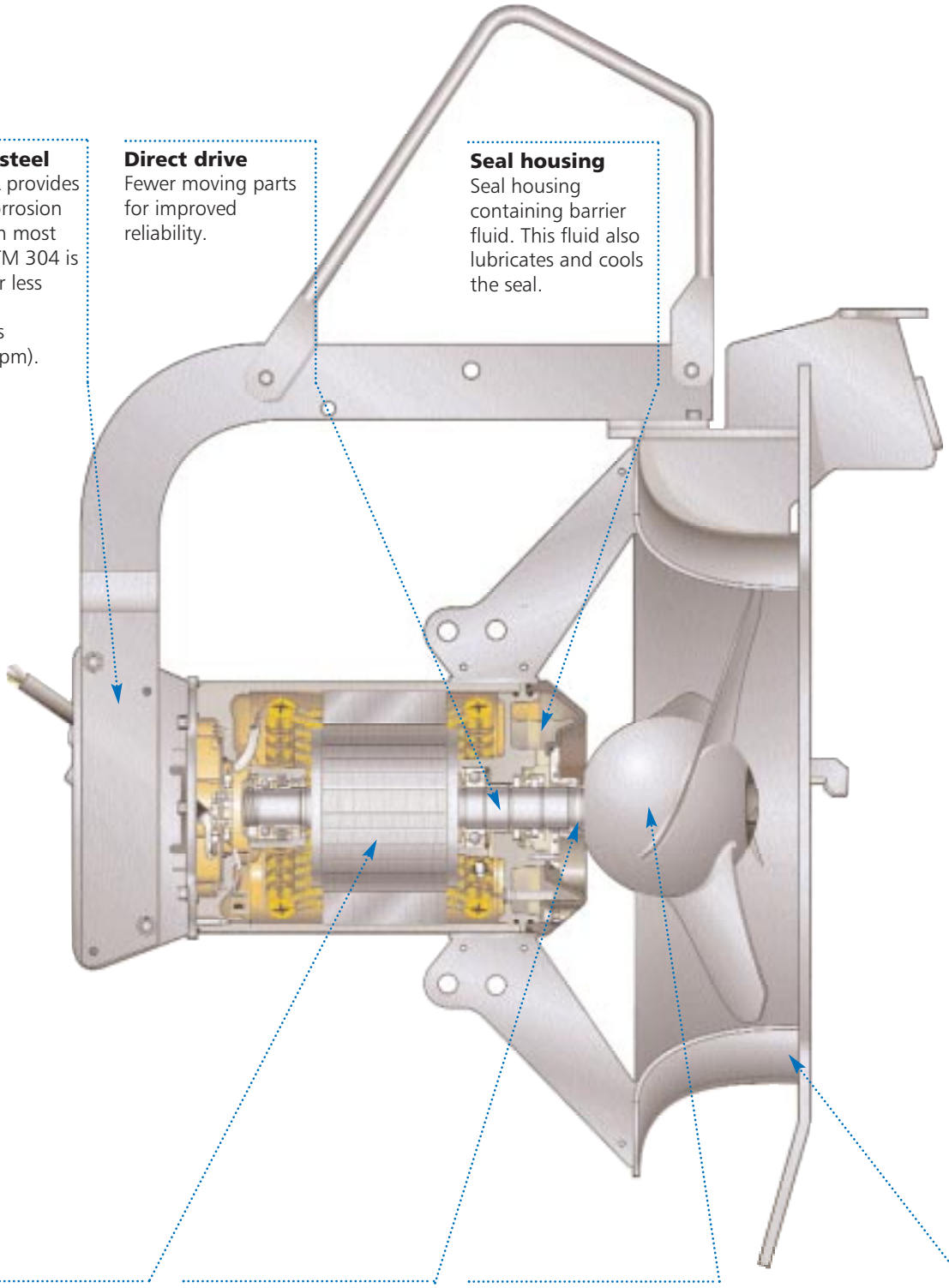
The Flygt 4600 horizontal propeller pump is designed for applications requiring very large throughlet at ultra low head. The pumps are extremely compact, using multipole motors instead of mechanical gearing.

Elimination of the gear casing saves mechanical wear, improving reliability. The reduction in moving parts is also more service friendly.



Model	4630/4640	4650/4660	4670/4680
Shaft power	50 Hz 1.5/2.5kW 60 Hz 1.9/3kW 2.5/4.0 hp	50 Hz 5/10kW 60 Hz 5.6/11.2kW 7.5/15.0 hp	50 Hz 13/25kW 60 Hz 14.9/30kW 20.0/40.0 hp
Discharge	DN 400 U.S. 16”	DN 600 U.S. 24”	DN 800 U.S. 30”

Attention to detail



Stainless steel
ASTM 316L provides excellent corrosion resistance in most liquids. ASTM 304 is available for less demanding applications (Cl^- <200ppm).

Direct drive
Fewer moving parts for improved reliability.

Seal housing
Seal housing containing barrier fluid. This fluid also lubricates and cools the seal.

Electric motor
Multipole squirrel cage induction motor with thermal overload protection. Designed for direct on-line start.

Plug-in seal
In-house designed shaft seals, combined into one, rigid plug-in unit, protect the motor from media intrusion.

Propeller
Thin double-curved blades for maximum efficiency. Propeller blades can be welded to the hub at certain angles to provide optimum duty point.

Inlet cone
The uniquely contoured inlet cone minimizes dynamic loss and tip vortices.

The ‘no lose’ equation

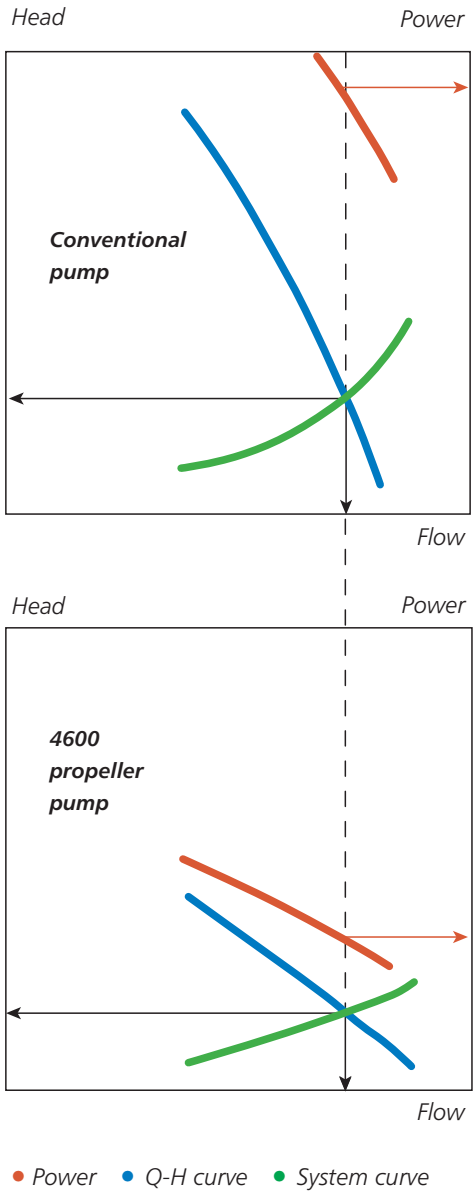
Conventional wisdom says there must be a catch. Experience of our Flygt 4600 horisontal propeller pumps shows there is not. And here’s why.

Firstly, conventional pumps work at a less efficient point on their performance curve when pumping large volumes at very low head. The propeller pump solution minimizes losses, raising the overall system efficiency. And because Flygt propeller pumps work best when pumping large volumes at low head, a smaller pump is required to do the job of a larger conventional pump.

Secondly, installation of the Flygt 4600 propeller pumps is very cost-effective. The pumps are simply lowered down guide bars where they connect to the discharge mounting. No special sumps are needed.

Thirdly, the special design of the propeller’s hub allows optimization of the blade angle to the required flow. This, coupled with the multipole motors, means no gearcase is required. The number of moving parts is reduced, resulting in enhanced reliability and simplified maintenance.

The unique swept back blade profile reduces the risk of clogging.



The combined effect of lower system losses and a pump designed for ultra-low head, gives drastically lower power demand.

Counting the costs

The true test of a new solution has to be the bottom line. The following example compares overall costs of installing and running propeller pumps with a conventional pumping system in, for instance, a denitrification process.

Using a propeller pump solution, a much lower power rating is required to do the job. Typically a 13 kW Flygt propeller pump can be used.

$ 11,250

The civil engineering required, check valve flange and construction, is straightforward too.

$ 6,250

Finally, because a smaller pump does the work, energy costs are dramatically reduced, year after year (10 kW x 8,000 hrs).

$ 5,000

Total 1st year.

Capital cost

(20% of investment) $ 3,500

Running cost + $ 5,000

$ 8,500

In a conventional installation, much larger pumps are required in order to obtain the required volumes. Typically a 40 kW pump may be required.

$ 15,000

Construction of the sump and installation of the pumps represents a sizeable capital cost.

$ 13,750

On top of which the yearly energy costs for the larger pump continue to mount (25 kW x 8,000 hrs).

$ 12,500

Total 1st year.

Capital cost

(20% of investment)

Running cost $ 5,750

+ $12,500

$18,250

Xylem [ˈzīləm]

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

We're 12,000 people 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.

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