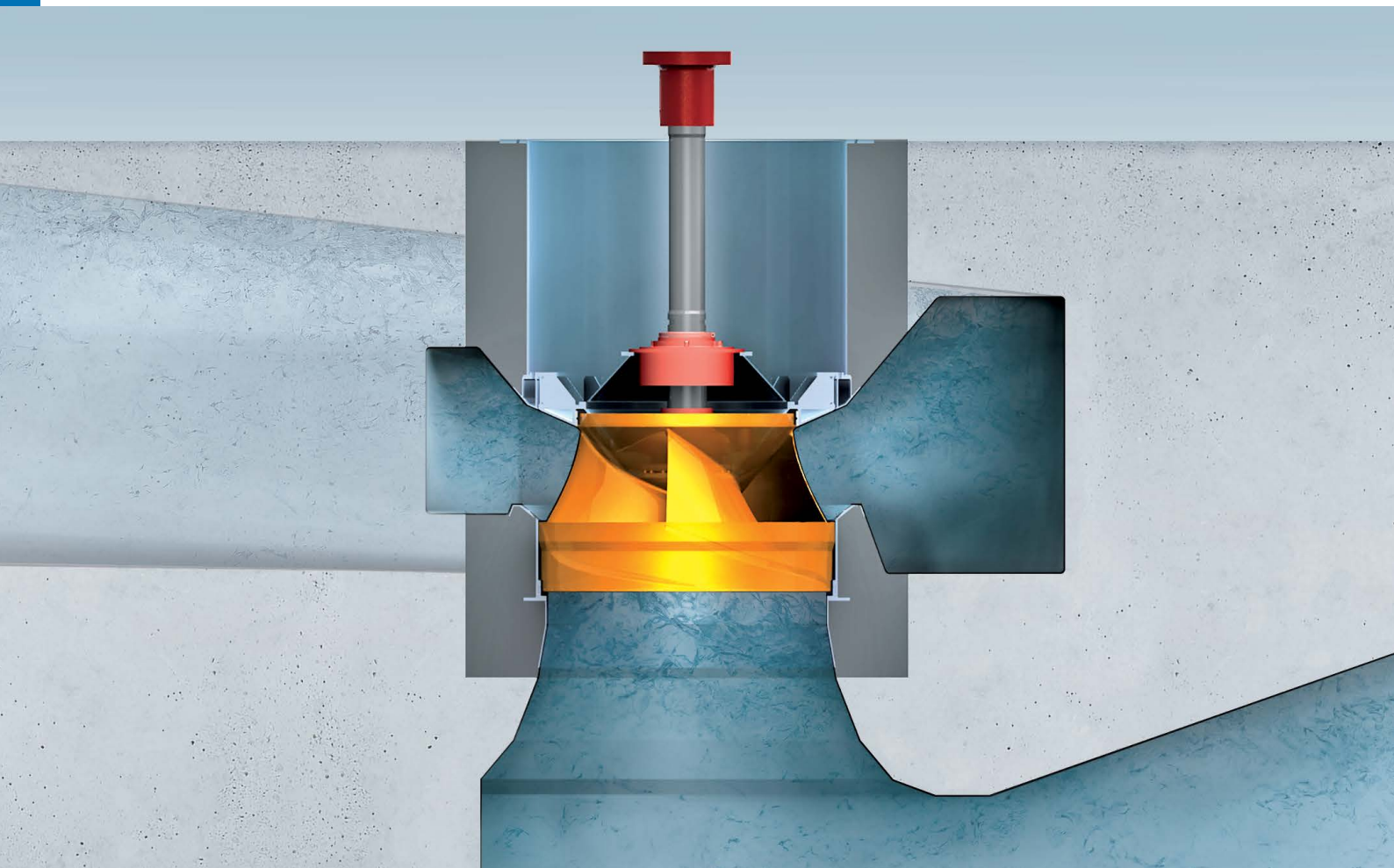


**ANDRITZ**  
Concrete volute pumps



# Customized pump engineering

## Solutions for customers' requirements

For over 100 years, ANDRITZ has been a byword for competence and innovation in building centrifugal pumps.

Extensive experience and great flexibility in accommodating our customers' needs have made ANDRITZ a preferred partner on a global scale. From R&D to design and manufacture to after-sales-service, ANDRITZ offers the entire value-added chain from a single source.

Using concrete volutes is a well-known technology that has been applied in the water turbine business for over a century.

ANDRITZ HYDRO has been installing Kaplan turbine units successfully all around the world since 1926. The design principle

of Kaplan turbines with concrete casings is the same as that used for concrete volute pumps.

Based on its many years of experience and on the exacting demands customary in the water turbine sector, ANDRITZ HYDRO has adapted its technology to concrete volute pumps and designed sophisticated concreting systems ensuring smooth execution and accurate results.

From the technological and economic points of view, concrete volute pumps are the best solution when large amounts of water are to be delivered. The concrete casing has a long service life and is resistant to erosion as well as to both seawater and brackish water. Furthermore, the material costs are low.

### Fields of application

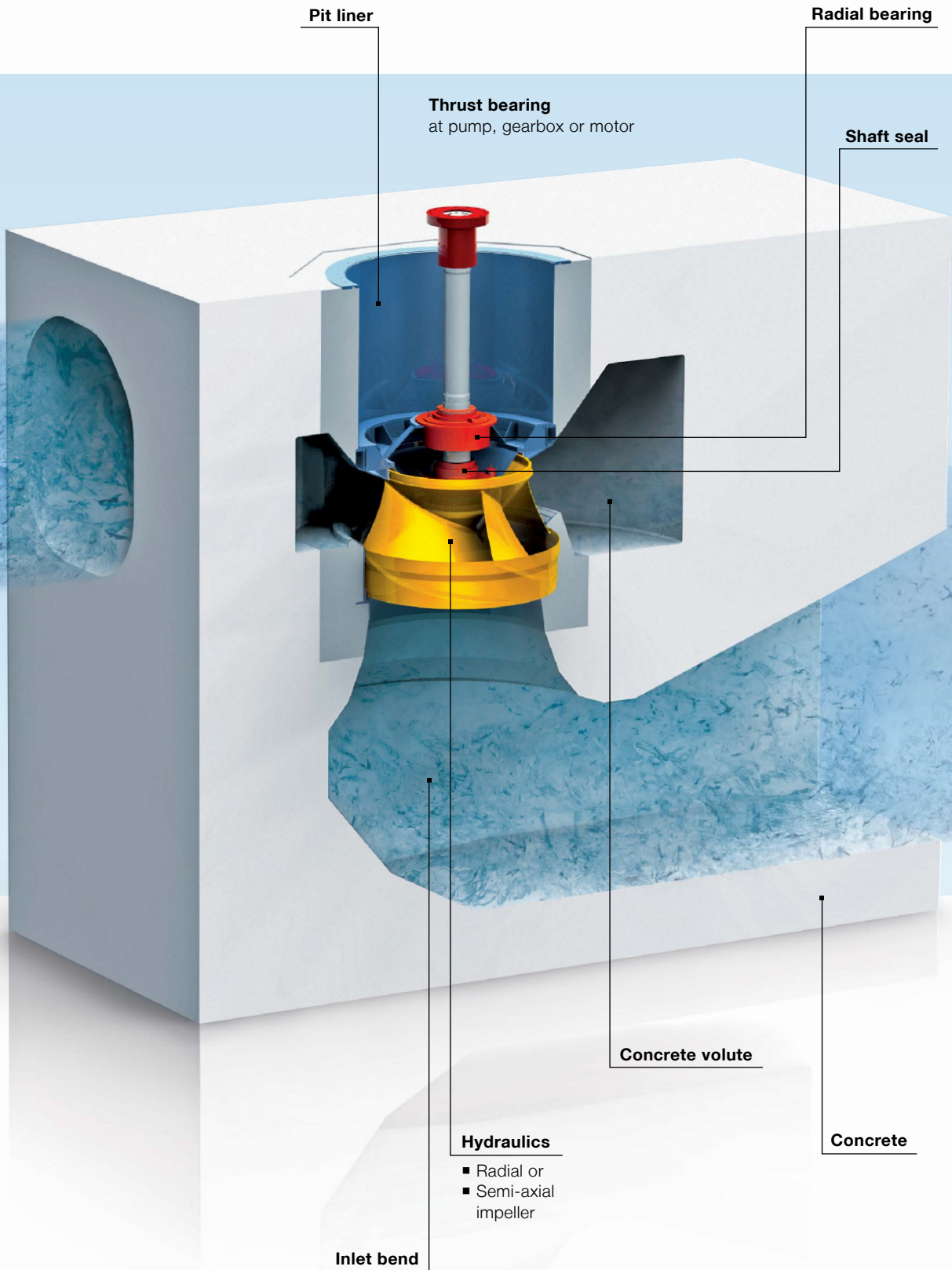
Power generation:

- Cooling water pumps for power stations
- Fresh water and seawater transport for irrigation and drainage
- Flood control
- Drinking and industrial water supplies
- Seawater intake pumps

### Design parameters

- Radial or semi-axial impeller
- Flow rate up to 50 m<sup>3</sup>/sec
- Head up to 40 m
- Power up to 20 MW





# Three construction procedures for concrete volute pumps

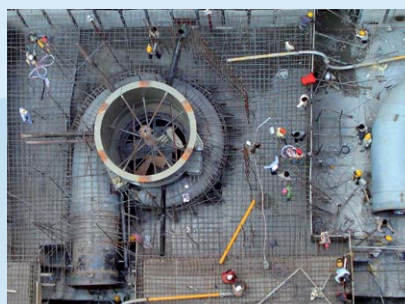
## In-situ casting

Wooden formwork is positioned at site and the surrounding concrete is cast in two stages. The formwork can be reused several times and is easy to lift as well as position. For large sizes, the investment costs are relatively low in comparison to other solutions. The concrete surface is resistant to brackish water or seawater.



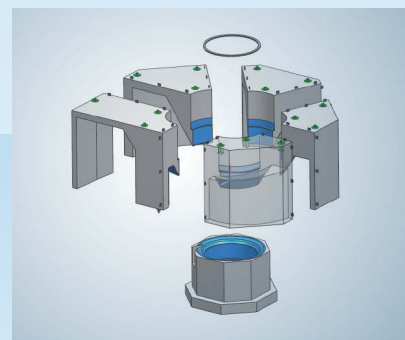
## Steel liner

The steel liner of the volute is used as permanent formwork. Depending on the size of the volute, the liner parts can be welded at site. This option is an advantage with small pumps in small numbers. For seawater applications, this type of volute liner is expensive because it must be made of stainless steel or have expensive coating.



## Prefabricated elements

The pump volute is split into a certain number of concrete blocks, which are cast in a concrete factory. The parts are then shipped to site and assembled. The advantage is that the civil work at site need not be particularly accurate. The volute surface is resistant to brackish water or seawater.



	In-situ casting	Steel liner	Prefabricated elements
<b>Large size of pump (D1* &gt; 2 m)</b>	+++ Wooden formwork costs are low	++ A lot of steel required which is relative expensive	+ Many heavy concrete blocks difficult to transport and position
<b>Medium size of pump (1.6 m &lt; D1 &lt; 2 m)</b>	++ Wooden formwork costs are low	++ Steel costs get less expensive in relation	+ Difficult positioning of heavy concrete blocks
<b>Small size of pump (D1 &lt; 1.6 m)</b>	+ Pulling out of formwork after concreting starts to get difficult	+++ Steel volute can be easily manufactured	++ Small concrete blocks are easy to position and adjust at site
<b>Small number of equal pumps (n ≤ 3)</b>	++ Formwork costs are low, reusal of formwork makes no sense	+++ Price difference between steel and wood is not relevant	+ High effort for small number of pumps (high capacity of mobile crane)
<b>Large number of equal pumps (n &gt; 3)</b>	+++ Formwork can be reused several times	+ Big price difference between steel and wood	++ Required efforts are feasible
<b>Sea or brakish Water</b>	+++ Concrete surface is resistant and not corroding	+ Expensive coatings or stainless steel liners are required	+++ Concrete surface is resistant and not corroding
<b>Delivery time and transport of formworks/liners/blocks to site</b>	+++ Production time of formworks is fast; Easy positioning of formworks at site	++ Production time of liners is fast, welding of liner parts at site	+ Production of elements takes plus ≈1 month, high efforts for concrete blocks positioning
<b>Concreting at site</b>	+ Careful pouring of concrete	++ Careful pouring of concrete	+++ No very accurate civil work necessary at site

\* D1 = impeller inlet Ø

The evaluation matrix above is simplified. The decision on which construction procedure to choose shall be done case by case and include various individual requirements. ANDRITZ HYDRO is looking forward to supporting you in finding the best solution for your project.

# Benefits to convince you

Every pump type has its justification and its advantages for applications with specific requirements. Due to the resulting installation conditions (small

difference in head between inlet and outlet), concrete volute pumps are especially beneficial for applications with high discharges (5-50 m<sup>3</sup>/s) and

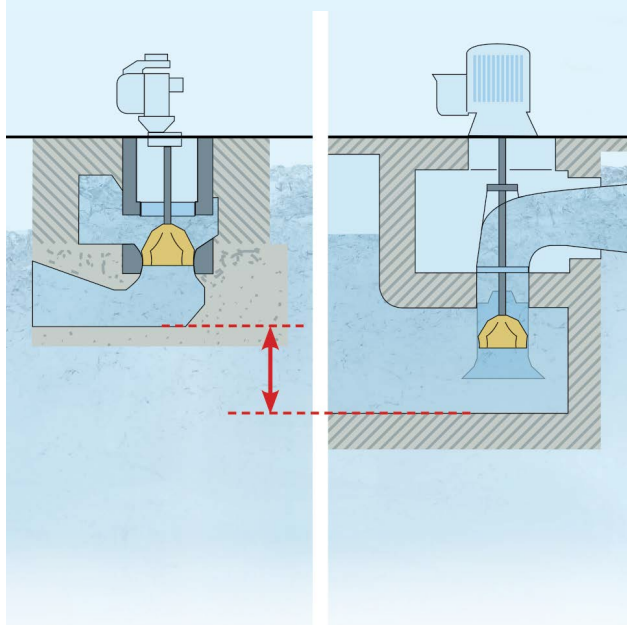
low heads. Normally, vertical line shaft pumps are used for this type of application.

## Reduced investment costs

Compared to the conventional design of vertical line-shaft pumps, concrete volute pumps also have an inlet bend, which guides the water optimally to the impeller. Another essential difference is the much shorter distance between the center line of the impeller and the discharge pipe. This results in a very compact design, less construction depth being required, and reduced construction costs. In comparison, the vertical line shaft pump can be up to twice as heavy.

Concrete volute pump

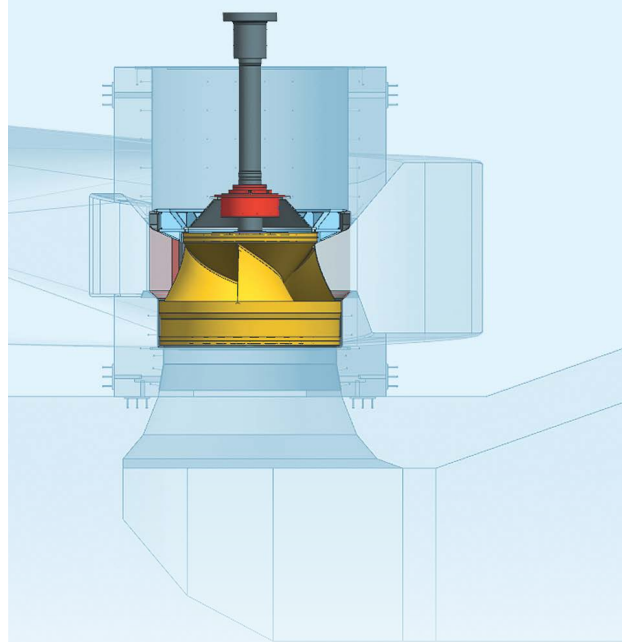
Vertical line shaft pump



## Easy maintenance

The concrete volute pump basically consists of the concrete casing and the pull-out pump unit (rotating parts of the pump). The pull-out unit can be lifted out easily for maintenance purposes. The concrete surface is resistant to any kind of water and requires no maintenance. The fewer parts there are, the less maintenance is required.

Pull-out pump unit ▼



# Close to our customers

## ANDRITZ locations worldwide



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