

# CARGO PUMPING SYSTEMS FOR HARSH OFFSHORE CONDITIONS



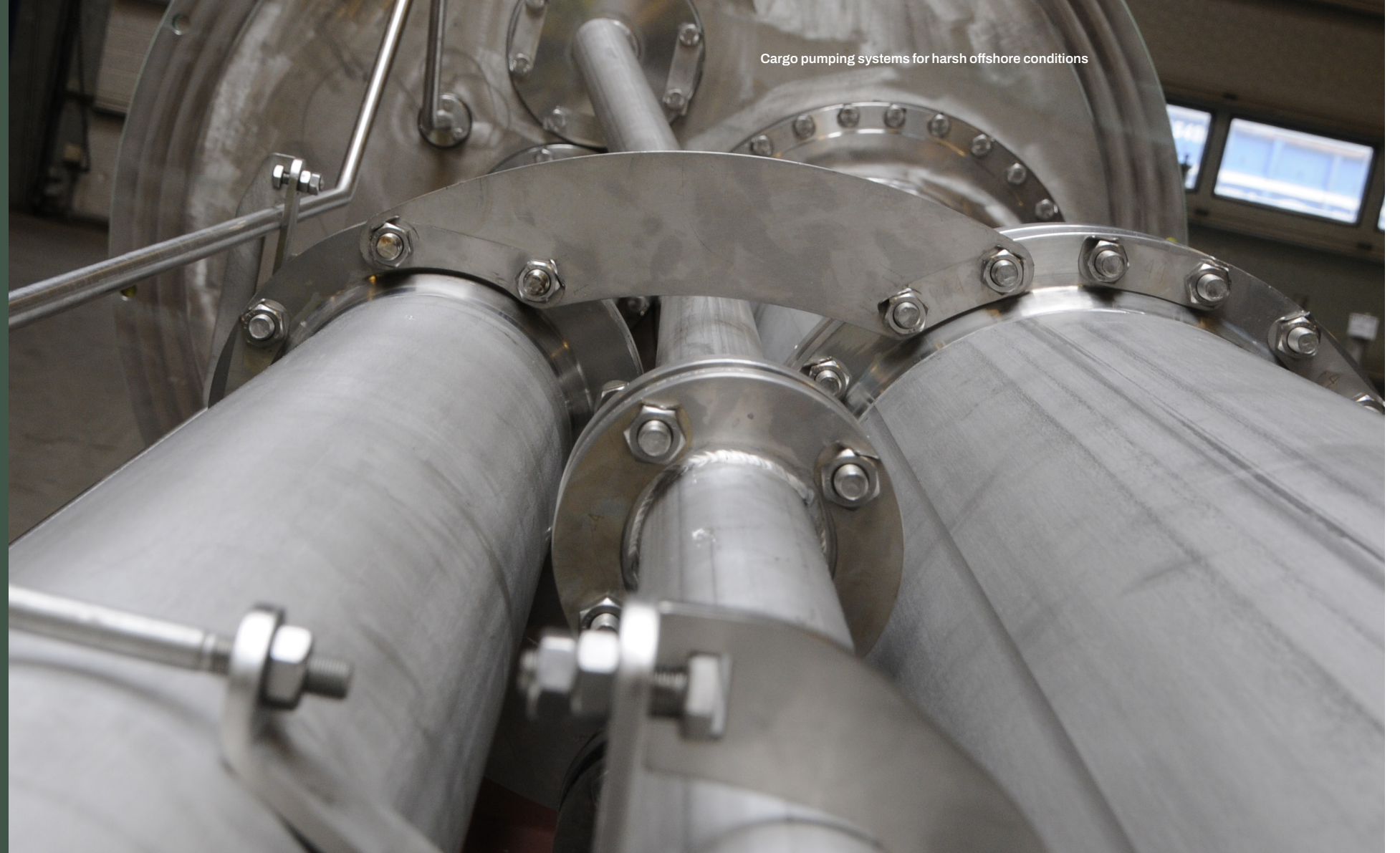


Deepwell offshore process and cargo pumps from Svanehøj, you get high performance, compliance and reliability in well-proven and robust design.

At Svanehøj we work based on the notion that we are better together. That's why a Svanehøj solution equals a long-standing partnership and first-class lifecycle support from industry experts, who are committed to help you get the most out of your pump investment.

If you want to know more about how we can help you move forward, please don't hesitate to ask. We look forward to welcoming you on board.

[www.svanehoj.com](http://www.svanehoj.com)



## A promise of exceptional pumps

Based on Svanehøj's widely acknowledged and reliable deepwell pump technology, our offshore process and cargo (OPC) pumps have been specifically developed to meet the growing demands, high standards and comprehensive specifications for offshore operations.

Svanehøj is located in Aalborg, Denmark, and is dedicated to manufacturing deepwell pumps, focusing on developing outstanding electric driven pumps for the offshore industry. You will find Svanehøj deepwell pumps and systems all over the world at a wide variety of facilities, including FPSOs, FSOs, LNG and LPG FPSOs, and shuttle tankers. All of Svanehøj's combined

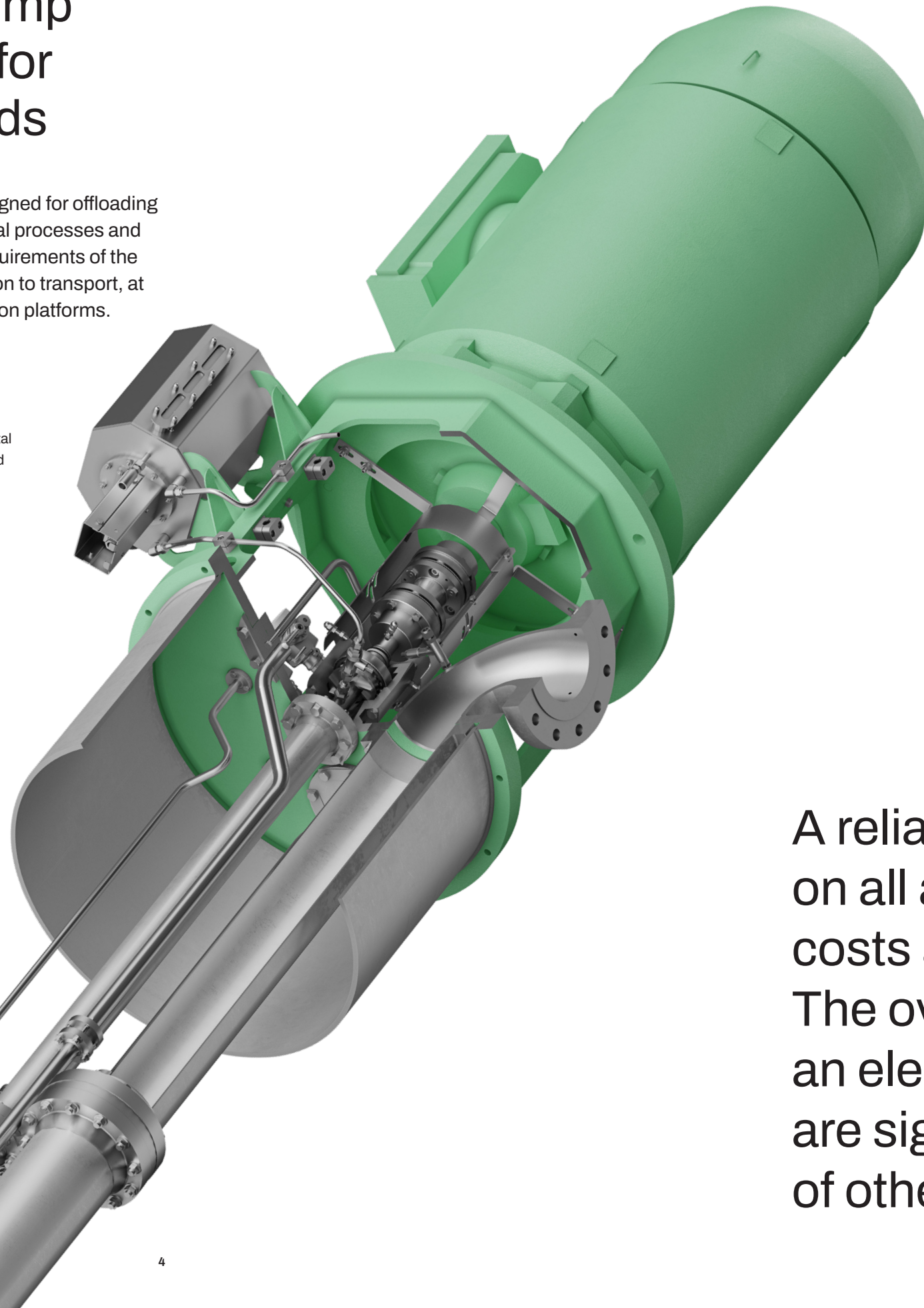
expertise and know-how is integrated in our OPC pumps, which is why we are proud to say, that our OPC solutions are more than a deepwell pump solution – it is a promise of a highly reliable system, minimized new-building and project risks, operational flexibility, economical and efficient lifetime operation and many other benefits, all wrapped up in unique and innovative designs.



# Our OPC pump is designed for your demands

Svanehøj OPC pumps are designed for offloading crude oil, chemicals and internal processes and are customized to meet the requirements of the offshore market, from production to transport, at both fixed and floating production platforms.

Our OPC solutions ensure maximum efficiency, reliability and environmental performance, full compliance with safety regulations and meet relevant environmental legislation, from API 610 technical standard to NORSOK health and safety standards.



## API 610

Compliant with API 610, meeting the highest standards of the offshore industry.

## Reliability and low maintenance

Proved reliability with a minimum of maintenance required due to easy access to the complete system and components that are designed for a long, serviceable life. Designed for a mean time between repair of 25,000 hours.

## Liquid-filled cofferdam

Double mechanical seal with liquid-filled cofferdam for monitoring of any leakages, with an option of an API 682 seal.

## Oil-lubricated transmission

Closed oil-lubricated transmission shaft/bearings with own lube oil circulation and filtration, suitable for pumping liquids containing solids, abrasive liquids or aggressive chemicals. Optional additions include oil level, bearing temperature and/or vibration monitoring.

## Low noise level

The low noise level of 80-85 dB(A) of the electric motor has a minimum impact on the surrounding environment and meets strict noise requirements.

## Testing

Full length testing available for longshafted deepwell pumps.

## Explosion-proof electric motor on deck

Compliant with the highest safety requirements, delivered with an IP56 protection.

## Capacity

Delivered in a capacity range from 20 to 1800 m<sup>3</sup>/hr and with a head up to 180 mlc. No matter capacity or size, all pumps have the same features.

A reliable, low-cost solution on all aspects, including initial costs and operational costs. The overall life cycle costs of an electric OPC pump solution are significantly lower than that of other available solutions.



# Compliant with API 610

The API 610 standard is the most used standard in the offshore industry, specified by the oil majors and operators.

The Svanehøj OPC pumps have been designed in accordance to the requirements of API 610, ensuring a robust design for the harsh offshore environments.

- The thrust bearing is oil-lubricated and has an L10 of minimum 25,000 hours.
- The bearing material is PEEK with superior properties for hydraulic oil applications.
- The design of the wear ring clearance leaves no contact between impeller and stator. Comes with wear ring on the pump housing or with wear rings on both housing and impeller. Available in different materials, and secures a hardness difference of min. 50 Brinell and low abrasive wear.
- The discharge base is cast, and the discharge flange is dimensioned in accordance with API 610 table 4 (twice the value for side nozzles).
- The maximum distance between the shaft bearings is in accordance with API 610 in order to maintain the first critical speed above the maximum allowed continuous speed.
- API 682 cartridge seals are an option.
- The pump is capable of at least a 5% head increase at rated conditions by replacement of the impeller with one of larger diameter.

## Reduced installation and maintenance

In order to meet the requirements of low installation costs, the OPC pumps require a minimum of assembly at the shipyard. The pumps are delivered assembled in 40' containers, installed as one unit and are easy to align and connect to cables where no high pressure oil pipes are required.

The pump head can be dismantled in the tank and lifted out without removing the pipe stack, and in case a complete overhaul is required, the pump can also be lifted out of the tank in 2.5, 3 or 6 m sections.

### Furthermore, maintenance on board is kept at a minimum due to:

- Shaft lubrication system
- No flushing and no pressure test required
- Easy dismantling of pump house
- Electric motor on deck
- Easy interchangeable cards on converters

## Specifications and standards

We have developed our products and processes to fulfil the strict specifications and standards used in the offshore industry. Our OPC pumps can comply with:

- API 610
- API 671 (coupling)
- API 682 (sealing arrangement)
- NORSOK
- Oil Majors' specific technical standards
- Classification society rules and regulations for floating production units
- ATEX Certification



## Unique testing facilities

At our factory in Aalborg, Denmark, we have installed a unique testing tower, making testing of OPC pumps and other deepwell pumps available to our clients before final inspection and shipment.

Standard performance tests include testing for capacity, head, power and efficiency in short length. Upon request, we are also able to perform a unique full length test. The pump is lifted into the tower in one piece and subsequently installed, ready for a full scale test of parameter measurements such as temperature and vibration. Upon request, we are also able to conduct a complete unit test with the customer specific motor and variable speed drive panel. The tower was built in 2003 and has been utilized for numerous offshore projects.



# AT YOUR SERVICE

We are available at all times and all locations. Our support hotline can be reached 24/7, and thanks to our extensive global network, our engineers can be on-site within 24 hours in the case of outages of failures. We're there for you whenever, wherever.





# Customized electric drive system

Frequency converters for electric motors enable the motor and hence the pump to run at variable speeds, resulting in optimum pump performance at any unloading conditions.

The variable speed will ensure a smooth pressure build-up in the pipes in the first phase and excellent stripping performance with lower speed in the final phase of operation.

**Customized switchboard**

A Svanehøj OPC pump solution most often includes a variable speed drive panels which can be arranged in different designs, depending on customer requirements for redundancy and flexibility.

**The three most popular solutions are:**

- Standard solution with 1 converter per pump
- Compact solution with 1 converter for 2 pumps
- Matrix solution with a reduced number of converters, not dedicated one specific pump

The system can be connected to low, medium or high voltage, have its main supply through the transformers, and the converters can be delivered air – or water cooled.

# What makes the difference

With Svanehøj you not only get the most trusted and renowned offshore pump solutions on the market but a vast number of advantages:



**Expert advice is priceless**

At Svanehøj you will be working with first-class designers of OPC pumps. We have the expertise, know-how, and experience within the industry, and we are a production facility which is 100% dedicated to deepwell pumps.

We offer expert advice on your next OPC pump investment and will make sure that you end up with the most advantageous layout for your operations. Our many years of experience and numerous renowned references are your guarantee that we deliver our promises on OPC pumps.



**Lifetime support**

We know that in order to maintain optimized efficiency and pump performance, our proximity and responsiveness are essential elements in your pump solution. That is why we deliver after sales support through our network of service centres in over 70 countries worldwide. Our global network of sales and service centres ensures that we can provide first class technical spares and service support to our customers wherever they may be located.

Furthermore, a Svanehøj solution equals service and support throughout the lifecycle of your installations and is not only confined to yearly inspections and performance tests. Service and support may also include basic support, installation and commissioning, performance optimization, upgrades and conversions, as well as service projects and agreements. Also, our spare part packages can include start up, two year spare parts, and capital spare parts.



**Health, safety and enviroment**

**Our solutions ensure safe and reliable operation for offshore applications with limited exposure to the environment. Electric driven deepwell pumps offer clients many benefits, including:**

- High system efficiency with use of “clean” electricity.
- Low power consumption results in lower CO2 emission.
- Low noise level from the electric motor of 80-85 dB(A).
- Low vibration levels and consequently avoidance of structural-borne noise.
- No risk of hydraulic oil spill on deck or to sea.

