Our offshore specialists have extensive experience in supporting the exploration and production sectors with environmentally friendly, innovative and integrated equipment solutions.

These benefit offshore facilities engaged in every stage of oil and gas field development, from exploration and drilling through to production and transport, including fixed and floating production platform and shuttle tankers.

Within liquid cargo handling we can offer a wide range of pumps and pumping systems:

- Cost efficient/low lifecycle cost
- One supplier for all pumping applications
- Proven safe and environment friendly
- Engineering services

Highly sophisticated FPSOs/FSOs are in operation with equipment including:

- Distributed Deepwell Pump Systems
- Pump Room Systems
- Ballast Pumps
- Fire Water Pump Packages
- Seawater Lift Pumps
- Booster Pumps
- General Service and Engine Room Pumps
Svanehøj Group electrically driven deepwell pumps use less energy than other comparable distributed pump systems.

- One pump - one tank
- Electric drives - single speed, two speed or variable speed via frequency converters
- High system efficiency - low operational cost
- Logical and easy system to operate
- Few rotating components - minimized life cycle cost
- Single lift installation - low cost
- Environment-friendly solution - no pollution - low noise
- Full head pumps or combined cargo lift and booster pumps available
- For FPSOs/FSOs with a requirement for a distributed pump system, Svanehøj has developed a cost effective crude oil handling system comprising electrically driven deepwell pumps.
- Upon customer’s requirement several driver solutions and system combinations are available. All solutions meet the requirements for safe handling. Easy start up, easy tank stripping, minimized operational cost and a few number of rotating parts provide a highly stable operational system.

Svanehøj Group can perform string tests on each pump type delivered.

String tests are in accordance with ISO 9906 and are performed at our own purpose-built test facility located at the manufacture and assembly site at Svanehøj, Denmark.

The tests can be performed in full and short lengths and include monitoring of among others:

- Flow rate
- Pump total head
- Speed of rotation
- Power input
- Pump efficiency
- Lateral vibrations
- Noise measurement
- NPSH
BENEFIT OF VARIABLE SPEED

Using a frequency converter for electric motors enables the motor and hence the pump to run at variable speeds. Frequency converters enable the pump to operate with optimum performance at any unloading conditions. This will result in a higher total system efficiency and hence lower power consumption.

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.

TYPICAL DISTRIBUTED PUMP SYSTEM CONFIGURATIONS

Full Head System

With each cargo pump driven via frequency converters.

This system gives the best flexibility and enables the most optimum offloading. In addition it is the most energy efficient and provides excellent stripping performance.

Lift Pump & Booster System

With fixed speed cargo pumps and booster pumps driven via frequency converters.

This system gives less flexibility, but can depending on pump capacity and pressure requirements, enable cost savings.
The traditional Pump Room System (PRS) is characterized by a separate room for pumping equipment located between the engine room and the cargo hold - an arrangement that provides easy access to all key-components for regular inspection and maintenance.

The dry-installed pumps are driven by dedicated prime movers located in the engine room in a vertical or horizontal arrangement. Gas-tight shaft seals prevent any hydrocarbon gasses from entering the engine room.

An automatic stripping system is normally supplied with the cargo pumps and occasionally, also with the ballast pumps depending on duty. When required cargo and ballast valves with matching actuators can also be supplied.

The complete pumping process can be controlled and monitored remotely either automatically or manually from the cargo control room or bridge. The system is prepared for easy integration with other systems onboard. Important features of the system are compact and space-saving configurations for optimal pump room layouts, combined with high operational efficiency.
Hamworthy Pumps can supply the complete cargo handling system as an integrated package consisting of:

- Cargo pumps
- Drivers - steam, electric or diesel based
- Steam condensers
- Stripping systems
- Stripping pump
- Tank cleaning pump
- Ballast pump
- Bilge pump
- Transmission/deckseal units
- Valves/actuators
- Control and monitoring systems

**PRIMING AND CAPACITY REGULATING SYSTEM**

The prime movers are placed in the safe-zone of the engine room allowing free selection of alternative drivers. Priming and capacity regulating systems convert any centrifugal pump into a self primed unit. This ensures optimal discharge capacity and stripping performances to reduce total discharge time to an absolute minimum as the system is capable of emptying the cargo tanks entirely no separate stripping pump is needed. The complete process is automatically or manually remotely controlled.
Hamworthy Pumps has developed various system solutions to meet the customer’s requirements for Fire Water Pump Packages installations.

Most commonly used are the direct electric driven fire pump, the direct diesel driven fire pump and the direct driven diesel booster pump combined with a hydraulically driven lift pump.

The diesel driven pumps may be equipped with various starting systems and may be delivered as a containerised unit.

In addition to the main components, optional equipment including jockey pumps, room coolers and fuel supply systems may be delivered.

**Typical capacity range:**
- 600 - 2500 m³/h within NFPA 20 requirements
- up to - 5000 m³/h outside NFPA 20 requirements

### FIRE WATER PUMP CONFIGURATIONS

1. **DIRECT DIESEL DRIVEN FIRE PUMP**
2. **DIESEL DRIVEN FIRE BOOSTER WITH HYDRAULIC DRIVEN LIFT PUMP**
3. **DIESEL DRIVEN FIRE BOOSTER WITH ELECTRIC DRIVEN LIFT PUMP**
4. **DIESEL/ELECTRIC DRIVEN FULL HEAD FIRE PUMP**
5. **DIESEL DRIVEN DEEPWELL FIRE PUMP VIA 90 GEAR**
6. **DIESEL/ELECTRIC OR HYDRAULIC DRIVEN DEEPWELL FIRE PUMP**

### PUMP FEATURES

Hamworthy Pumps in-line configurations for fire water pumps have the following features:
- Double suction impellers with low NPSHr enable the pump to operate at 150% capacity without cavitations.
- Ni-Al bronze used as the standard material. Other materials, such as Duplex and Super Duplex SS, are available as options.
- Double volute.
- Lightweight, compact and robust design.
- Mechanical shaft seal as standard, other seal arrangements are available on request.

The deepwell pumps used have the following features:
- Multi stage, single suction vertical deepwell pump.
- Material in 316L, Duplex or Super Duplex SS.
- Capacities up to 1800m³/h.
- Pump design in accordance with API 610.
Svanehøj Group supplies two main types of seawater lift pumps. Our range of seawater lift pumps are based on well-known technology, offer safe operation and low maintenance cost for the demanding offshore market.

**Dry Installed Pump Type With Suction From A Sea Chest**
Low NPSHr to meet stringent offshore specifications, configurations of inlet and outlet nozzles to suit every piping installation. Either directly coupled to an electric motor within a safe area or through a cardan shaft installed in the pump room. We supply a range of high quality casing and impeller materials including nickel, aluminium, bronze or super duplex.

**Caisson Installed Deepwell Pump Type**
The well proven and expertly engineered vertical suspended packages for vertical electrical submersible pumps and vertical line shaft pumps (API 610 VS1) are designed for MTBR of 25000 reliable operational hours, and are optimized for high efficiency and low NPSH. The design incorporates features to protect the caisson against scuffing and crevice corrosion hence minimising galvanic corrosion. Engineered hypochlorite dosing rings and air release valves are available, and the pumps can be delivered in duplex and super duplex material.
Marine Pumps

- Complete package
- Compact design
- Easy maintenance
- High quality materials
- Vertical design - space saving construction
- Axially/radially split with spacer coupling for easy access to pump interior
- Self priming
- Full range of accessories
- Capacities from 20m³/hr to 6000m³/h
- Well proven - more than 15000 pumps in service

FPSo ‘Sendje Ceiba’ is equipped with pumps for fire/seawater and condenser cooling.

Our Services & Support solutions range from basic support, installation and commissioning, performance optimization, upgrades and conversions to service projects and agreements focusing on overall equipment performance and asset management.

We always provide first class technical, spares and services support to our customer wherever they are around the world. In addition, we are well supported by agent representatives in all major shipping locations.

CONTACT US

Hamworthy Pumps Singapore Pte Ltd
15 Bencoolen Crescent
Singapore 029978
Singapore
Tel: +65 6261 8066
Email: SGpumpSales@hamworthy-pumps.com

Hamworthy Pumps UK Ltd
Unit 4C New Fields Business Park
St Philips Road, Poole
Dorset BH17 0NF
Tel: +44 (0) 785 951 1102
Email: gpumps@hamworthy-pumps.com

Svanehøj Danmark A/S
Fabriksparken 6,
9220 Svenstrup J
Denmark
Tel: +45 98 37 22 00
Email: svanehoj@svanehoj.com
Website: www.svanehoj.com