

Firewater Pump Systems

for FPSOs and FSOs

Pump Systems

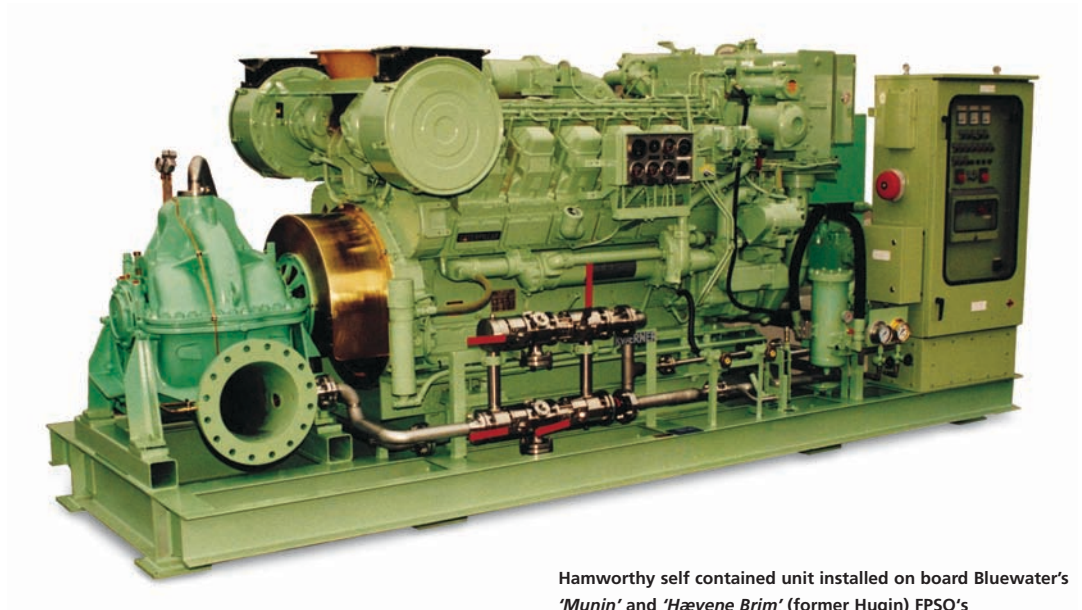
Hamworthy offshore

Hamworthy is a leading designer and manufacturer of reliable, environmentally sound solutions for offshore applications

The company specialises in innovative and often highly customised designs for liquid cargo handling, including LNG and LPG cooling and refrigeration, inert gas generation, liquid gas and crude pumping and wastewater management systems.

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 platforms and shuttle tankers.

Hamworthy fire pump packages are crucial for the safety on board FPSO/FSOs.

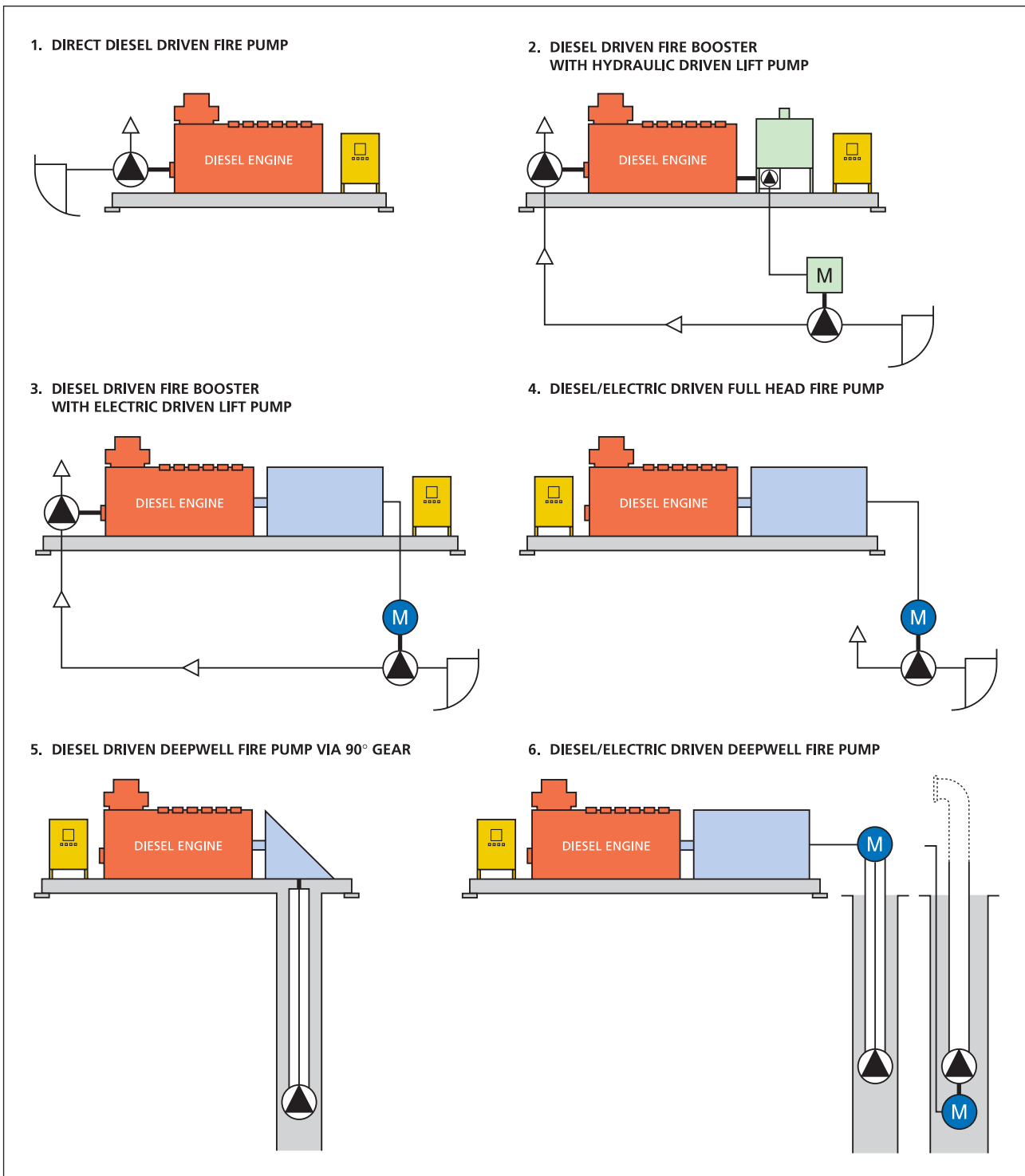


Hamworthy self contained unit installed on board Bluewater's 'Munin' and 'Hævene Brim' (former Hugin) FPSO's

Various fire pump systems

Hamworthy has developed various system solutions to meet the customer's requirements for fire pump package installations. All units meet NFPA 20 and class requirements.

Different combinations based on diesel engine as main power unit are available:



Diesel/Hydraulic driven system

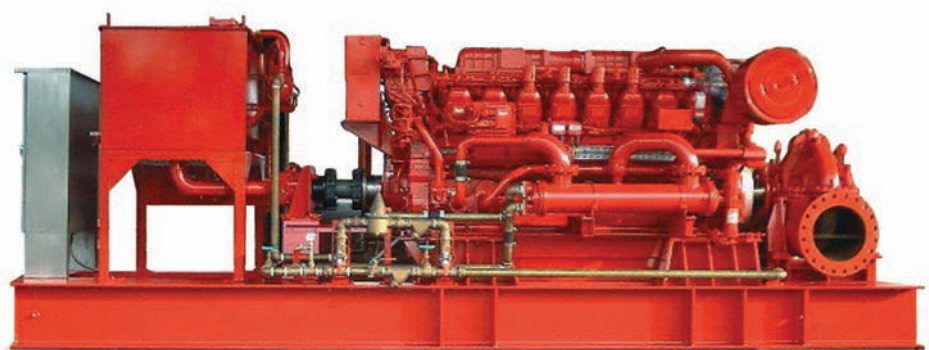
The diesel/hydraulic is suitable when the main fire pump installation must be done above the draught line, typically in a compartment below deck in the fore peak.

A system for such installation consists of the following as minimum:

- Diesel engine
- Booster pump
- Lift pump
- Hydraulic system
- NFPA 20 controller
- Room cooler

A hydraulic driven lift pump will be installed taking suction from a sea chest, pumping the water to the booster pump connected directly to the main diesel engine.

The advantage with such a system is the minimum risk for water hammers when installing a non-return valve after the dry installed in-line lift pump.



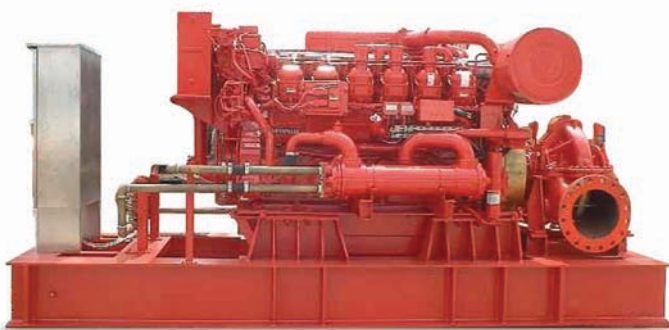
1500 m³/h – 16 bar diesel driven fire pump with hydraulic lift pump for Petronas' 'Lukut' FPSO

Direct diesel driven system

The direct diesel is suitable when the fire pump installation is possible beneath the draught line.

A system for such installation consists of the following as minimum:

- Diesel engine
- Fire pump
- NFPA 20 controller
- Room cooler



1500 m³/h – 16 bar direct diesel driven fire pump for Petronas' 'Lukut' FPSO

Electric driven system

The electric driven system to be installed beneath the draught line. The fire pump can be supplied both in vertical and horizontal configuration. The motor may be cooled with water taken from the fire pump. Can also be supplied with diesel generator set as shown on page 3 fig. 4.



A system for such installation consists of the following as minimum:

- Fire pump
- Electric motor
- NFPA 20 controller/starter

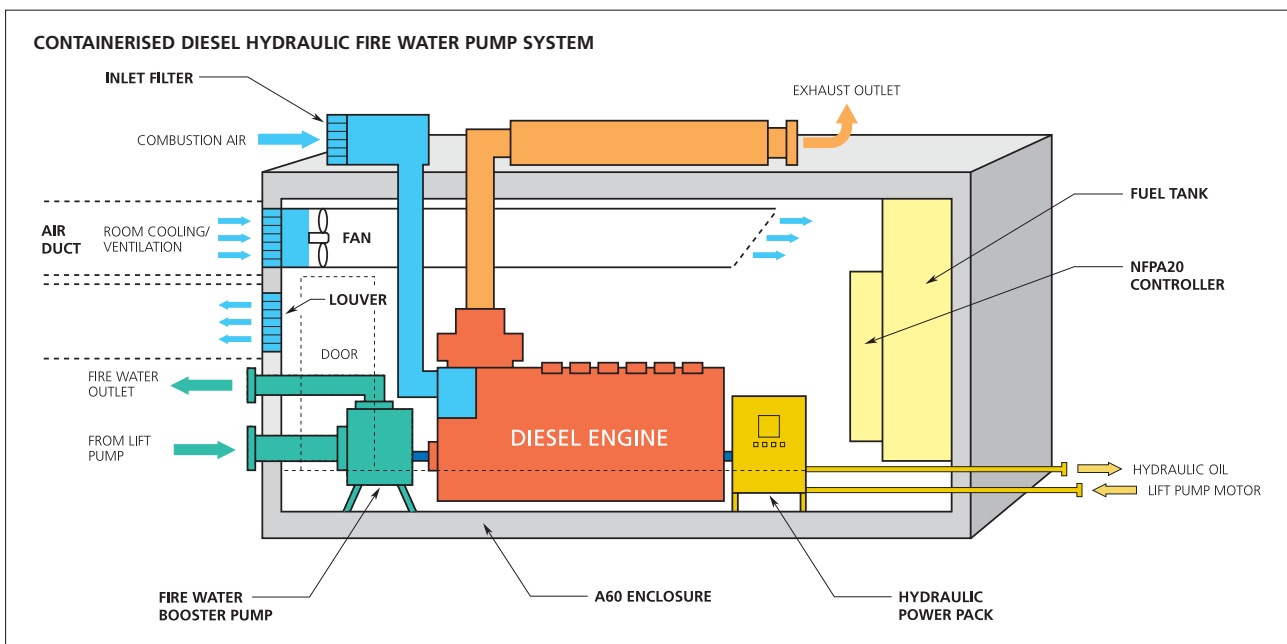
Typical electric driven pump

Enclosed modules

All Hamworthy fire pump systems can be supplied in containers.

The enclosure is H-60 insulated in material AISI 316 stainless steel. All our containerised equipment is designed for easy installation and good access to all major components.

The units may be equipped with fire and gas detection and fire extinguishing system.



Capacity range

Depending on the configuration, Hamworthy KSE can supply fire pumps according to NFPA 20 up to 5000 m³/h in capacity.

Our in-line pumps used for fire pumps have a wide range from 600 m³/h to 5000 m³/h

Double suction impellers with low NPSHr enables the pump to operate at 150% capacity without cavitation

Our deepwell pumps are able, according to NFPA 20, to pump up to 1500 m³/h

Pressure available up to 18 Bar

Pump features

The in-line pumps used as fire pumps have the following features:

Material in Ni-Al-Bronze as standard, other material on request

Double suction impeller and double volute

Compact and robust design

Mechanical shaft seal as standard

Starting systems

The starting systems supplied by Hamworthy always conforms to NFPA 20. The following types are available:

Electric: Electric starting with batteries

Pneumatic: Starting with pressurised air

Hydraulic: Starting with pressurised hydraulic oil

Hamworthy KSE recommend using double electric start to meet the regulations. This is the most cost effective solution.

All starting methods can be done in combinations.

Accessories

In addition to the main equipment such as diesel engine, pumps and NFPA 20 controller, Hamworthy can include the following optional equipment:

Complete air starting system – air receiver with compressor or air amplifier

Diesel tank complete with valves and instrumentation

Jockey pumps and pressure vessel with pressure controllers

Room coolers

Foam pump and tank

References

Hamworthy have supplied various fire pumps to a number of FPSOs:



Bergesen Offshore's 'Sendje Ceiba' FPSO



CNOOC's 'Panyu' FPSO

Bergesen Offshore's 'Sendje Ceiba' FPSO is equipped with three high voltage electric fire pumps and one diesel driven pump with hydraulic driven lift pump.

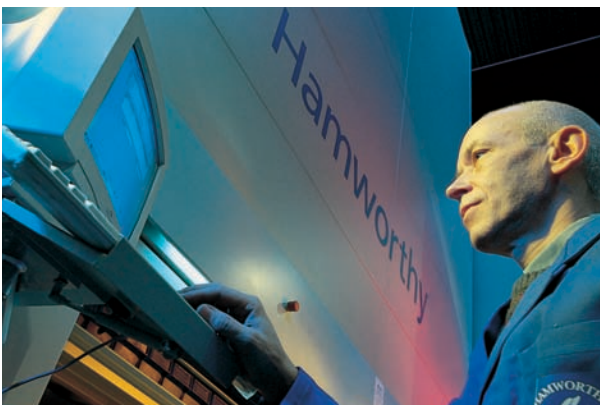
CNOOC's 'Panyu' FPSO is equipped with two high voltage electric fire pumps.

Petronas 'Luket' FPSO is equipped with one direct diesel driven fire pump and one diesel/hydraulic driven fire pump system.



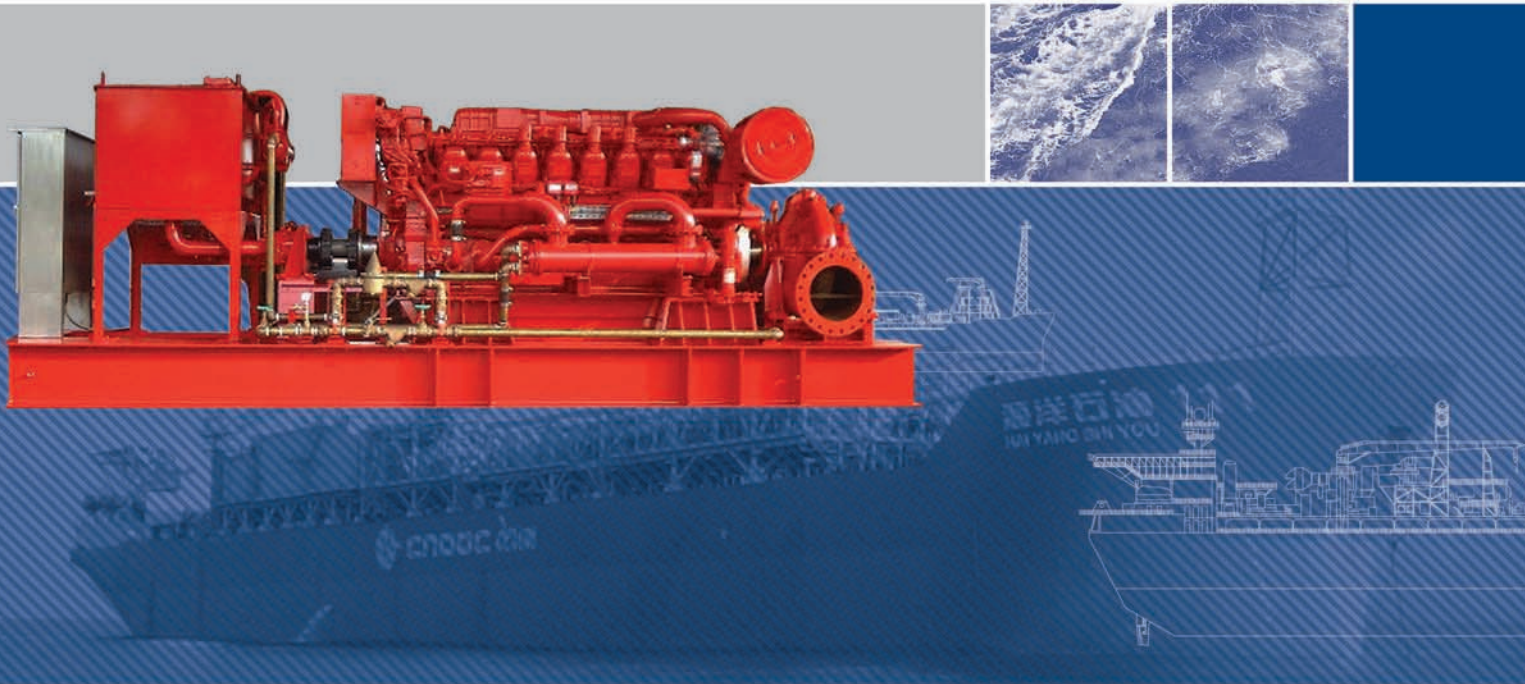
Petronas 'Luket' FPSO

Complete through-life support



With worldwide support and service we are well placed to offer you effective maintenance back-up on your Hamworthy pumping system. With our close connection to the marine industry over many years, our spares organisation is capable of responding to breakdown in a matter of hours.

From installation to in-service operation Hamworthy pumps are backed up by dedicated engineers to ensure you have complete through-life security and support.



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