WÄRTSILÄ supplies various configurations of Fire Water Pump Packages (FWPP), including:

- Diesel/hydraulic driven system.
- Direct diesel driven system.
- Direct electric driven system, vertical or horizontal.

All systems can be delivered with either in-line centrifugal pumps or deep well submerged pumps. Wärtsilä Hamworthy FWPPs are designed to be self-contained according to NFPA 20 regulations, while meeting the operational requirements of the marine, offshore, and onshore markets.

**CAPACITY RANGE**

Wärtsilä is able to supply its FWPPs according to NFPA 20 with a range of capacities, as follows:

- For in-line pump configurations, our capacity range is from 300m³/h to 6500m³/h.
- With a deepwell submerged pump configuration our capacity is up to 1800m³/h.
- For all capacities the differential pressure availability is up to 18 Bar.

**WHY A WÄRTSILÄ HAMWORTHY FWPP**

- More than 100 years of experience in designing and manufacturing centrifugal pumps.
- We manufacture and assemble our FWPPs at our Singapore facilities, close to conversion and new building yards in South-East Asia, China and Korea.
- Full String Test capabilities at our assembly site.
- Wide range of FWPP configurations and capacities.
- Advice and consultations with the client during the pre-FEED, FEED and Detail Design stages.
- FWPPs for non-hazardous locations can be both containerized and open for fire compartment installation.
- Worldwide service and spare parts network for support during installation and operation.
- Extensive reference list for both offshore and onshore FWPP installations.
- Classified by all societies, including BV, Lloyd, DNV and compliant to NORSOK.

**BROAD SCOPE OF SYSTEM SOLUTIONS TO MEET REQUIREMENTS**

Wärtsilä has more than 100 years experience in the design and manufacture of pumps. Our development of system solutions to meet customer needs for fire water pump package installations is based on this extensive experience.

Fire Water Pump Packages (FWPP) are crucial for safety, and Wärtsilä Hamworthy FWPPs meet the National Fire Protection Association’s NFPA 20 standard and class requirements.

Wärtsilä’s global service network provides reliable operational support for its oil industry customers, especially during emergency operations.
Wärtsilä’s 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, 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.

**DIRECT DIESEL DRIVEN DEEP WELL SYSTEM** (fig.5 & 6)

The deepwell pump can also be driven by either an electric motor together with a diesel generator set, or by an hydraulic motor together with a diesel hydraulic set (fig. 6).

**ELECTRIC DRIVEN SYSTEM** (fig. 7)

The electric driven system is suitable when the FWPP is installed beneath the low water line. The fire pump can be supplied in both vertical and horizontal configurations. Depending on the size and requirement of the el. motor, the motor may be cooled with water taken from the fire pump or by air. A typical FWPP system for such an installation consists of the following:

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

The electric driven system can also be supplied with a diesel generator set as shown in fig. 4.
NFPA 20 Controller

The NFPA 20 controller ensures that the pump operates according to the regulations given in NFPA 20. The FWPP system is supplied self-contained, and is in accordance with strict operational requirements such as when in fire mode, the controller will only start the fire pump when:

- The fire main pressure drops below the set value of the pressure switch
- Receiving a fire & gas signal
- Receiving a manual start signal, either locally or remote
- A wiring failure occurs (fail-safe design)

Likewise in fire mode, the controller will only stop the engine when:

- Engine overspeeds
- Local stop button is pushed

Accessories

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

- Diesel tank complete with valves and instrumentation
- Jockey pumps and pressure vessel with pressure controllers
- Room coolers with hydraulic/electric driven fan
- Foam pump and tank
- Separate engine cooling system
- Enclosure for weather protection, non pressurized container
- Enclosure for hazardous installation, pressurized container

Figure 8 gives a typical schematic drawing of a Diesel Hydraulic FWPP system.

Starting Systems

Two separate starting systems should be installed as per NFPA 20 requirements. The following three types are available:

- Electric starting with batteries
- Pneumatic starting with pressurized air
- Hydraulic starting with pressurized hydraulic oil

The starting system most frequently used for complying with the regulations is the double electric starter. This is the most cost-effective solution. All starting methods can be used in combinations.

On-Site Testing Facility

A full String Test is performed for the complete Fire Water Pump Package at our Singapore plant for all types of FWPP configuration. The String Test is performed in accordance with NFPA 20 requirements and includes a running test at 100 and 150% capacities. The comprehensive test program ensures that the NFPA 20 Controller is functioning correctly in all required modes and that it reacts correctly to all specified alarms.
EXPERIENCE AND RECENT SUCCESSES

FPSO PAPA TERRA
Scope of supply:
**2 x Diesel-hydraulic skids (lift & boost)**
Q = 1700 m$^3$/h, H = 130 m
Power: 1097 kW @ 1500 rpm
Pumps: CAD350 & CB32

1x **Direct diesel skid**
Q = 1700 m$^3$/h, H = 130 m
Power: 970 kW @ 1800 rpm
Pumps: CB32

Shipowner ................. BW Offshore, Norway

BULWER REFINERY
Scope of supply:
**2 x Diesel-hydraulic skids (single lift)**
Q = 1358 m$^3$/h, H = 97 m
Power: 857 kW @ 1800 rpm
Pumps: CL300, 3.8M length

“Short” CL300 pumps submerged in Brisbane river from jetty. Powered by remotely located diesel hydraulic skids

Customer............................. BP, Australia

FPSO KNARR
Scope of supply:
**2 x Diesel-hydraulic skids (lift & boost)**
Q = 2450 m$^3$/h, H = 140 m
Power: 900 kW @ 1800 rpm
Pumps: CAD450 & CC500M

2x **Direct diesel skids**
Q = 2450 m$^3$/h, H = 140 m
Power: 1900 kW @ 1800 rpm
Pumps: CC500H

Shipowner ............. Teekay Petrojarl, Norway

SERVICES

Wärtsilä supports its customers throughout the lifecycle of their installations by optimizing efficiency and performance. We offer expertise, proximity and responsiveness for all our customers in the most environmentally sound way.

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 deliver aftersales support through our network of service centres in over 70 countries worldwide.