

Active Pulse Pressure Compensator APPC



PRODUCT DESCRIPTION:

Design layout

- Cabinet mounted Active Pulse Pressure Compensator system.
- The system is installed to reduce/ eliminate surge pressure in firewater system caused by late fire pump start – up.
- Double compensator valves each with 100% capacity.
- Fully enclosed and insulated

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Design options

2 or higher pressure air cylinders

Standard materials

Skid enclosure: AISI 316L.
Outlet Piping/Valves: Titanium

Alternative materials

Piping: Cunifer
Valves: Alubronze BAS 1400 AB2

DESCRIPTION

Where to use Active Pulse Pressure Compensator (APPC)

The firewater system on an Offshore Oil Installation is normally built around a Firewater Ring Main (FRM), located on one of the lower decks.

Branches and risers are routed from the FRM to the individual firewater users, such as Deluge systems, Hydrants and Monitors. The firewater is fed into the FRM from large capacity Firewater Pumps (FP), located at sea level.

A Jockey Pump (i.e. a pump with low flow and high pressure capabilities) maintains FRM pressure at all times.

Following activation of a Deluge System (a high flow firewater user), the Jockey Pump cannot keep up with the demand, and the FP's are activated. The run-up time (normally 10 - 25 seconds) of the FP will, however, cause the upper parts of the firewater distribution piping to be drained, due to gravitational force. This drainage will create a vacuum (aka. Column Separation) in the upper parts of the firewater piping.

When the Fire Pumps are started the firewater will rapidly re-fill the drained piping, at high flow and pressure, accelerated by the vacuum. Further, because of the vacuum no air cushion is present, and this will create a very large pressure surge in the system, also known as "water hammer". Pressures exceeding 100 Barg have been experienced.

The Active Pulse Pressure Compensator (APPC) is installed to eliminate this problem; the unit must be installed at the top of the highest pipe risers from the Fire water Ring Main, like the helideck (or other risers)

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Technical Description

Main components

- The APPC skid comprises of the following main components;
- Two Rapid Response Pressure Regulating valves , (one is backup in case of maintenance)
- Compressed Air Reservoirs (80 liter cylinders – WP 250 Barg)
- Pressure Vessel, with Automatic Vent. Valve
- Heated and Insulated Cabinet for Cylinders and instruments
- Instrument air operated high pressure compressor

Operation

- During normal operation of the fire water system, the APPC is in "stand-by" mode.
- When a Deluge system is activated, the pressure in the fire water system drops until it reaches the set pressure of the APPC. This activates the Rapid Response Regulating Valves, which are designed to maintain the pressure in the Firewater system, with increasing flow.
- Air flows into the top of the riser, while just maintaining a positive pressure.
- When the firewater pumps are spinning up, the pressure in the firewater system increases. The Rapid Response Pressure Regulation valve will sense this immediately, and open up fully until the pressure reaches around 8 Barg.
- This will immediately retard the water column. The air cushion will effectively eliminate the surge pressure.
- When the firewater pressure is established above 8 Barg, the APPC unit will automatically drain the trapped air cushion to atmosphere.

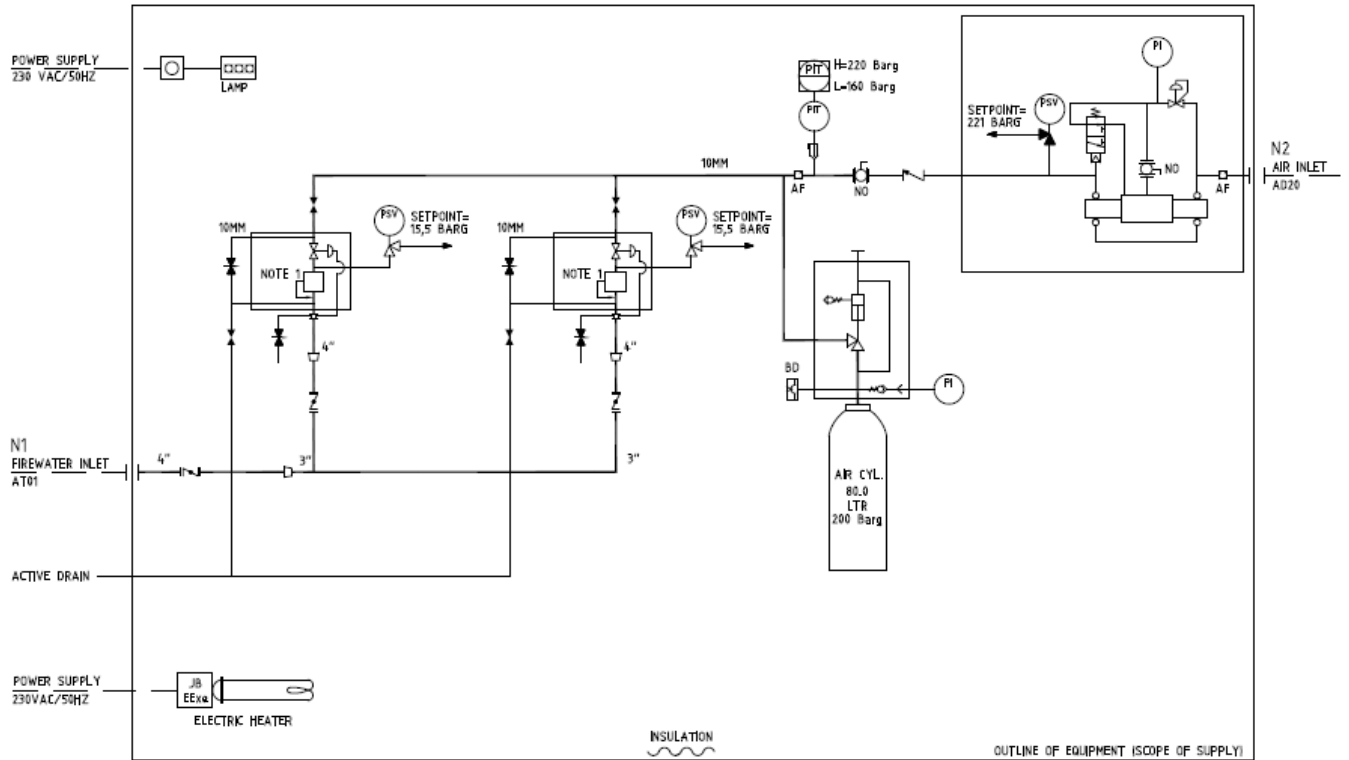
Compressed air supply

A instrument air operated high pressure compressor will automatically re-pressurize the Air Cylinders. Pressure is maintained at 200 Barg. The pressure is monitored in the Central Control Room via the Pressure Transmitter.

The Air Amplifier is powered by the Platform Instrument Air system.

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System Logic Drawing



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