

HELI-SEP OIL WATER SEPARATOR



GENERAL SYSTEM DESCRIPTION

The HELI-SEP Oily-Water Separator is a single vertical cylindrical vessel utilizing the dual capabilities of gravity assisted separation and coalescence to separate and remove insoluble oil, solids and entrained air from oily water.

The system can process oily water at its rated capacity and is designed to operate automatically in both continuous and intermittent operation without the need for chemical or other additives.

The HELI-SEP oily water separator has been thoroughly tested and approved by the United States Coast Guard under the authority of 46CFR 162.050-7 and by other

countries in accordance with the standards established by the International Maritime Organization (IMO) resolution MEPC.60 (33).

The Heli-Sep OCD model is equipped with an Oil Content Detector (OCD) mounted directly to the system to continuously detect the oil content of the processed water discharge. The OCD model also has an additional solenoid valve and piping connection to divert oily water back to the bilge or holding tank when the oil content exceeds the allowable discharge value. It has been tested and approved by the United States Coast Guard under the certificate of approval no. 162.050/3019/0 and by other countries in accordance with standards established by the International Maritime Organization (IMO) resolution MEPC.60 (33).

The system design incorporates three stages of oil-water separation in a single vertical cylindrical pressure / vacuum vessel. The stages of separation are:

1. Separation due to the difference in specific gravity between oil and water and a reduced flow velocity of the influent,
2. Coalescence of oil as it flows over a separating media matrix of corrugated parallel plates, and
3. Coalescence of residual oil droplets as fluid flows through a polishing pack of polypropylene beads.

This design provides the most efficient and effective means of separating oil from water, and eliminates the expense associated with replaceable media such as coalescer filter elements. The separating media, parallel plates and beads, do not require replacement.

FUNCTIONAL DESCRIPTION

The oily bilge water is drawn into the Separator by the system pump which is located on the outlet of the Separator to prevent the formation of mechanical emulsion.

The fluid enters the Separator near the bottom of the vessel, the solids sludge collecting chamber. Most of the oil separates from water immediately due to the difference in specific gravity and the reduced flow velocity inside the Separator. The fluid flows upward through the separating media matrix while solids and sludge drop to the bottom of the vessel. This path maximizes contact with the separating media to enhance coalescence of the oil and increase solid/sludge fallout. The fluid exits the separating media where the oil continues to flow to the top of vessel, the oil collecting chamber, due to the difference in specific gravity. The water is then drawn downward through the polishing pack of polypropylene beads. The polishing pack coalesces any residual oil that may be left in the water until the drops are large enough to break loose and rise into the oil collecting chamber. When sufficient oil has collected in the oil collecting chamber the oil sensing probes create a signal to stop the pump and open the clean water inlet valve. Pressurized water (sea water or fresh water) entering from the bottom of the Separator flows upward through the polishing pack and displaces the accumulated oil which is discharged through the oil discharge line. The upward flow of the clean water flushes out the polishing pack with each oil discharge cycle. After the oil has been removed and the oil sensing probes are again immersed in water, the Separator returns to the separating mode.

On the OCD model a slip stream of the processed water discharge is fed through the OCD to continuously monitor the oil content in parts per million (PPM). The OCD then controls the processed water discharge per its oil content; if less than 15 PPM, the processed water is allowed to discharge normally; if greater than 15 PPM, the process water is diverted for recirculation and reprocessing.

The Separator vessel is equipped with two sample valves to extract an oil sample and determine the oil/water interface level. The manual valve located at the bottom of the vessel is provided for draining the vessel and for dumping the solids and sludge which have accumulated in the bottom of the vessel, the solids sludge collecting chamber.

The Control Box contains a power switch which controls power to all internal circuits, and an operation switch to select Flush or Run operation.

Placing the Operation Switch in the FLUSH position will stop the system pump (if running), open the clean water inlet valve, flush the unit and discharge any accumulated oil.

Placing the Operation Switch in the RUN position will activate the system's pump for operation, and initiate the oil sensing probes to provide for the automatic discharge of accumulated oil and or air from the Separator. This is the NORMAL operating position.

The Control Box also contains three indicator lights. The red light illuminates when the control power is on. The amber light illuminates when oil is being discharged from the system. The green light illuminates when water is being discharged from the system.

A combination vacuum/pressure gauge mounted on the vessel indicates the vacuum or pressure inside the Separator's vessel. A pressure gauge mounted on the system's pump outlet indicates the Separator's discharge pressure.