

The oil containing sediments and produced salty water is emulsified in the 1<sup>st</sup> stage emulsifying device with water recycled from the 2<sup>nd</sup> stage desalter. This emulsion enters the 1<sup>st</sup> stage desalter where it separates by electrostatic coalescence. The oil flows from the top of the vessel while the effluent water is discharged to the water treatment system.

The oil is emulsified in the 2<sup>nd</sup> stage emulsifying device with the dilution water. This emulsion enters the 2<sup>nd</sup> stage desalter where it separates again by electrostatic coalescence. The cleaned oil flows from the top of the vessel while the water is recycled upstream the 1<sup>st</sup> stage desalter.



Electrostatic desalters are designed in accordance with proprietary design method which is supported by numerous crude oil desalters and oil dehydration units throughout the world for nearly twenty years.

Here below are presented some features of the Electrostatic Desalter design.

### **Electrodes Arrangement and Inlet/Outlet Distributor Headers**

Residence time and equalized flow distribution of the oil/water emulsion in the high voltage field is maximized due to the combination of our electrode arrangement and our inlet and outlet distribution headers.

The grids of electrodes are located just above the vessel centerline in order to generate the electrostatic field in the entire cross section of the desalter. The main electrostatic field is generated between the lower grid and the water interface.

The inlet header is fitted with special distributors located at the centerline of the vessel and insuring a calibrated horizontal flow of emulsion directly in the electrostatic field. This arrangement insure a perfect distribution of the oil/water mixture as well as a maximum residence time within the electrode area, thus maximizing micron and sub-micron sized water droplet coalescence providing effective water/oil separation and an efficient coalescence.

As the water/oil mixture enters the vessel below the electrodes, it is immediately subjected to an electrical field set up between the lower "hot electrode" and the water level (ground). This field is strong enough to coalesce and separate the water droplets. In addition, this design enhances desalter operation during upset conditions or when slugs of water are processed.

### High Voltage Entrance System

- The high voltage entrance system is the most important part of an electrostatic desalter unit.
- Our high voltage entrance presents the following features:
- It double protects the High Voltage Power Unit from entrance of oil by using a pressure bushing not only for vessel entrance, but also for the High Voltage Power Unit. Both of these bushings are enclosed in an oil-filled housing acting as a buffer zone.
- Both the transformer bushing and entrance bushing can be easily removed and replaced by the removal of the service inspection blinds in the oil-filled bushing housing (special wrench is supplied for tightening or removing the bushings). Bushing replacement can be made quickly without requiring the service of a Designer serviceman, and without draining the vessel.

The entrance bushing insulating material is high density teflon™ which has been thoroughly inspected to assure that there are no flaws. The surface is finely machined to a polished finish to minimise surface tracking. The bushings are designed for an operating pressure of 40 barg and 160°C

### High Voltage Power Unit



The electrostatic desalter is equipped with one power unit.

Designer utilises a non-overloading 100% impedance single phase, High Voltage Power Unit designed to allow the desalter to stay in operation even under upset conditions. This design also guarantees that voltage is maintained across the lower electrode and the water level as well as between the two electrodes; therefore highly conductive crudes can be processed without overloading the electrical system. Produced field is of alternative type.

The High Voltage Power Unit is CENELEC certified for use in hazardous area (Zone 1, Group II C, Temp Class T5).