



Produced Water Treatment and Oil Water Separation



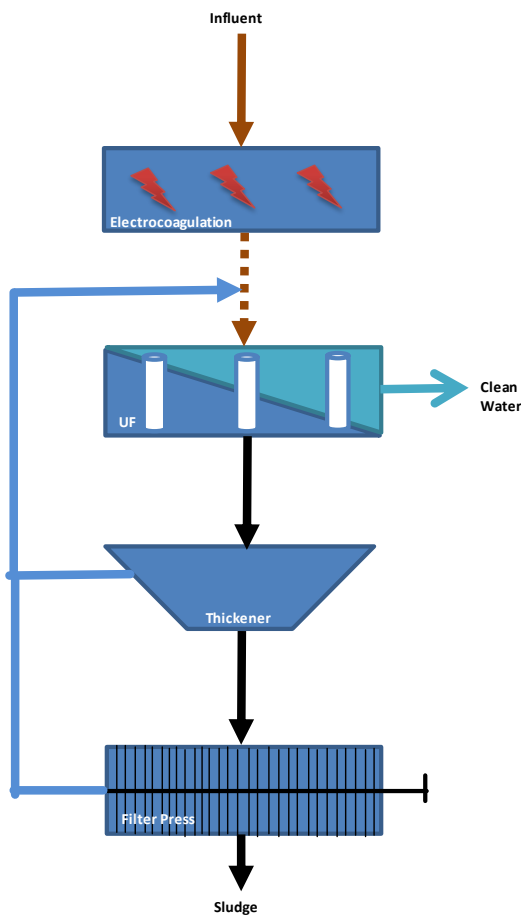
Discharge and re-injection of Produced Water from oil production is becoming increasingly challenging for the oil producers as the world's oil wells mature and the water cut increase. At the same time many regions are tightening the regulation for discharge of Produced Water which means that the oil producers have to look for new technologies in order to comply with the **environmental regulations**.

Electrocoagulation

Electrocoagulation is the process to mobilize solids out of water by applying an electrical current to the system. Not only suspended solids can be removed, but also dissolved solids are forced out of the water by certain oxidation reactions. "Electrocoagulation utilizes direct current to cause sacrificial electrode ions to remove undesirable contaminants either by chemical reaction and precipitation or by causing colloidal materials to coalesce and then be removed by electrolytic flotation. The electrochemical system has proven to be able to cope with a variety of waste waters. These waste waters will be reduced to clear, clean, odorless and reusable water.

Polymeric or **Ceramic Ultra Filtration membranes** can very easily produce permeate with less 5 mg/l oil. The main obstacle for membranes has been that polymeric membranes handle oil very badly and that ceramic membranes so far have been quite expensive. Due to the unique hydrophilic properties of Silicon Carbide it is possible to obtain much higher water fluxes on SiC based membranes than with other membrane materials. Continuous process flux for oil/water separation is recorded between 200 - 2000 L/(m²*h) - depending on the oil type.

This means that membrane filtration has become a viable alternative to hydro cyclones and induced gas flotation units.



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Electrocoagulation removes from water:

- Metals and heavy metals
- Suspended solids
- Colloidal solids
- Dissolved solids
- Fat, oil, diesel, complex organics
- Bacteria, viruses

Electrocoagulation Provides The Following Benefits:

- No chemicals used
- Low investment cost
- Low operating cost
- Low maintenance
- Stable and reliable operation
- Applicable to many different waste water streams
- Applicable for multiple contaminants
- Lower sludge production

Lower operating costs and lower investment costs

The high flux, by pretreatment with Electrocoagulation and membrane material SiC, reduces operating costs due to a lower energy consumption. The capital cost is also significantly reduced as fewer membranes are used. Furthermore, the smaller footprint of this membrane solution is a benefit where space is limited (E.g. off-shore oil rigs).

