The Principle of cross-flow filtration for oil / water separation
Membrane Technology
Overview on different filtration technologies
Membrane Technology

The membrane technology allows residual oil contents in the outlet of \( \leq 1 \text{ppm} \)

- Ceramic membranes mark a milestone in oily water separation
  - Flexible cylinder sizes for diverse flow rates
Membrane Technology

Bodywork of a ceramic membrane

- Ceramic module with coating

- Thermionic raster print of our ceramic membrane
- The medium flow from left to right
- Special sinter technologies allow a unique bodywork of the NFV membranes
1. Stage: Multi Phase Separation Profiles
   - Oil, water and solids are separated
   - Use of coalescence + adhesion to form larger oil droplets flowing upwards.
   - Solids slide down the profiles into the sludge holding tank

2. Stage: Membrane filtration
   - Residual oil is pressure – separated in the membrane by cross flow principle
   - Periodically backflushing
   - Automatic oil discharge
Simplified flow chart of the NFV membrane deoiling system

- Oily water tank
- Feed pump
- MPT
- MESB
- Sludge discharge
- MF: membrane filtration, separation of emulsions
- Backflush pump
- Membrane modules
- Cleaning tank
- Permeate
- Concentrate to dirt oil tank
- Oil free water, i.e., municipal water
- For usage, rest oil content < 3 ppm
- Oil discharge to dirt oil tank

MAHLE Industriefiltration GmbH, 2009

© MAHLE
The system is tested and certified according to:
MEPC 107(49)
NATO / German Navy

Characteristics are:
- Only one pump for suction- and pressure build-up
- Automatic backwashing without need of additional freshwater
- Integrated emulsion-braker for the concentrate
- Semi-automatic membrane cleaning
- Automatic oil discharge
- Fully automatic operation
Membrane Technology

Membrane Filtration Unit – industrial application

- Treatment of oil-contaminated-water, 15,000 l/h
Membrane Technology

References: Waste Water Treatment at Daimler

- 1. Stage
  Deoiler 2000
Membrane Technology

References: Waste Water Treatment at Daimler

- 2. Stage Membrane Deoiler
Membrane Technology

Membrane Filtration Test Unit

Reservoir water before and after treatment

Latest test unit at gasfield, Mai 2009
Water is life

With NFV Membrane Technology