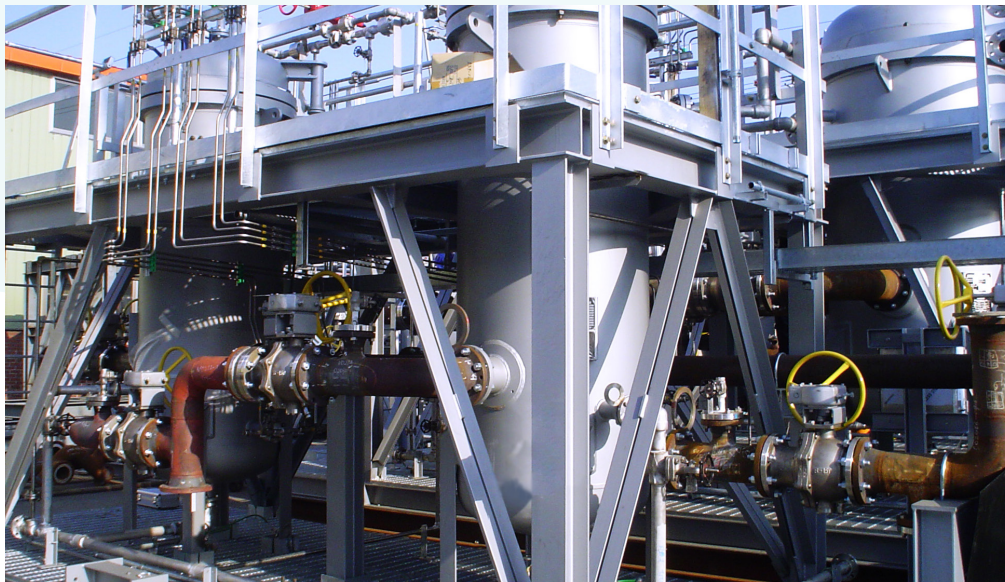


TORR™

TORR™ hydrocarbon coalescing technology, with its small footprint and ability to replace less efficient oil removal equipment, removes 99.9% of 2 micron and larger oil droplets from produced water streams and can be easily scaled up to address future water cut increases for operators.



BENEFITS

- + Small footprint & low weight
- + Increased polishing for reinjection applications
- + Same high de-oiling efficiency during production start-up periods
- + No additional treatment required for recovered oil
- + Minimal pressure drop & maintenance
- + Recovered hydrocarbons can be <0.5% BSW
- + High turndown

TORR™

The TORR coalescing system consists of radial flow coalescing elements housed within a separation vessel to achieve the separation of fine oil droplets from water while recovering the neat oil.

HOW IT WORKS

Produced water entering the TORR system is passed through a series of radial flow, coalescing elements. As the water passes through these elements,

residual oil droplets >2 micron in diameter are coalesced into larger oil droplets. The larger diameter oil droplets are then gravity separated in the same separation vessel, rising to the top of the vessel to create a neat oil layer that can be periodically recovered.

Any gas accumulating with the oil at the top of the vessel will be safely recovered and both the oil and gas will be returned to a suitable collection unit.

TREATMENT LEVELS

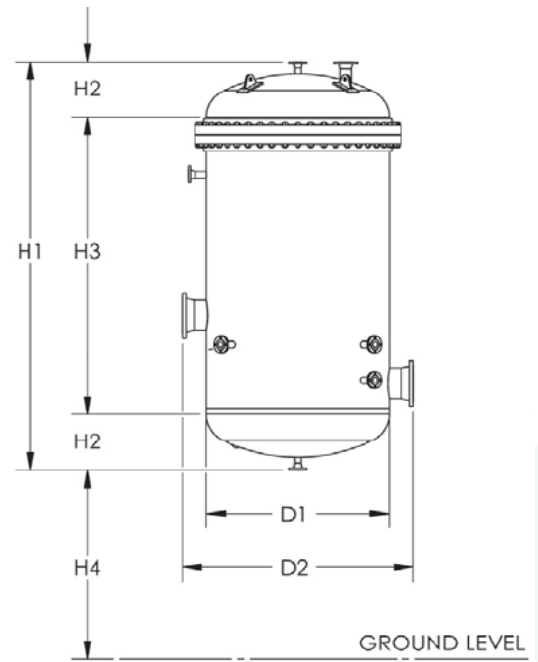
Schlumberger announced at OTC 2010 that they have had tremendous success worldwide, using TORR for De-Oiling Operations in Well Testing. They noted that the technology was able to reduce 20,000 ppm in the feed to 20 ppm at the outlet even with low-API oil.

TYPICAL TORR™ SYSTEM FOOTPRINT

30,000 BWPD	60,000 BWPD
15,700 bbls/m ²	17,600 bbls/m ²
(H1+H4) = 7.2 m	(H1+H4) = 7.5 m
D2 = 1.575 m	D2 = 2.0 m
Footprint = 1.9 m ²	Footprint = 3.4 m ²

TORR™ PRODUCT SPECIFICATIONS

Oil Density	API 16 and above
Fluid Temperature	Up to 95 C
Inlet Oil Concentrations	Up to 2000 mg/L
Oil Droplet Diameters	Down to 2 Microns
Produced Water Flow Rates	Scalable to any flowrate
Pressure Drop	7 to 10 psi
Flow Turndown Ratio	100:1
Gas Recovery	Up to 2-3%



TORR™ REMOVAL EFFICIENCY

