

# VORTOIL

## Deoiling hydrocyclone

### APPLICATIONS

- Oil production
  - Produced water treatment for discharge or reinjection
  - Freewater knockout preseparation
- Refining and chemical processing
  - Deoiling feed to strippers
  - API separator replacement
  - Desalter water discharge

### ADVANTAGES

- High-density hydrocyclone packing for small footprint
- Ramped geometry that maximizes flow and minimizes erosion
- No moving parts, low maintenance, no external power required, and minimal controls
- Removable involute that enables easy disassembly, cleaning, inspection, and replacement
- Range of material options to suit corrosive and erosive environments
- Insensitivity to motion, making it ideal for floating production systems
- Availability as an equipment solution or as part of an operating services contract

VORTOIL\* deoiling hydrocyclones are widely used in offshore oil production for the efficient treatment of large volumes of produced water. Based on the physics of enhanced gravity separation and free vortex action, the hydrocyclone has a cylindrical inlet followed by a tapered tube with the liquids entering through tangential inlets. These forces, combined with differential pressures set up across the hydrocyclone, enable the heavy phase to exit at the underflow while the lighter phase falls into reverse flow and exits the overflow at the opposite end.

### Operating principle and key features

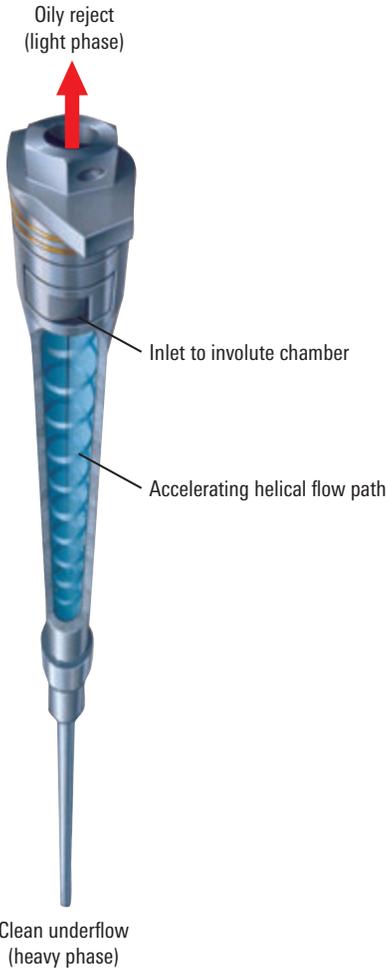
VORTOIL hydrocyclones are used to separate two liquids of differing densities, such as oil from water. Usually driven by process pressure, oily water enters the line through the inlet to the involute chamber and is directed to flow along the liner wall. Forced down the liner, the fluid accelerates in the narrowing cross-section, developing the forces required to separate the oil droplets. Centrifugal forces acting upon the heavier water phase cause it to migrate to the wall of the tapered section. As a result, the lighter oil phase is displaced and forms a central, low-pressure core, which is removed via the reject. The outer clean water vortex exits via the underflow.

### Performance

VORTOIL hydrocyclones offer high performance, small size, high capacity, light weight, high reliability, and low-cost operation. We can improve your existing hydrocyclone system performance by retrofitting any existing hydrocyclone vessel with higher-efficiency, higher-capacity VORTOIL hydrocyclones. Our hydrocyclone systems can also be packaged with other Schlumberger technologies to meet stringent environmental discharge limits.



VORTOIL hydrocyclones reduce capex because their high packing density allows smaller vessel sizes and weights.



With no moving parts inside the vessel, the VORTOIL hydrocyclone's functional and streamlined design reduces maintenance requirements.

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## Product range

We have extensive experience on both conventional deoiling processes and preseparation for concentrations of oil in water in excess of 2%.

While VORTOIL hydrocyclones are designed for liquid-liquid separation, it is recognized that many applications contain sand, resulting in highly abrasive wear. Schlumberger can address this problem through the use of a variety of special wear-resistant materials, including tungsten carbide.

We provide full testing services and will visit your installation with a range of our liners to undertake testing and ensure optimal selection.

## Options and types

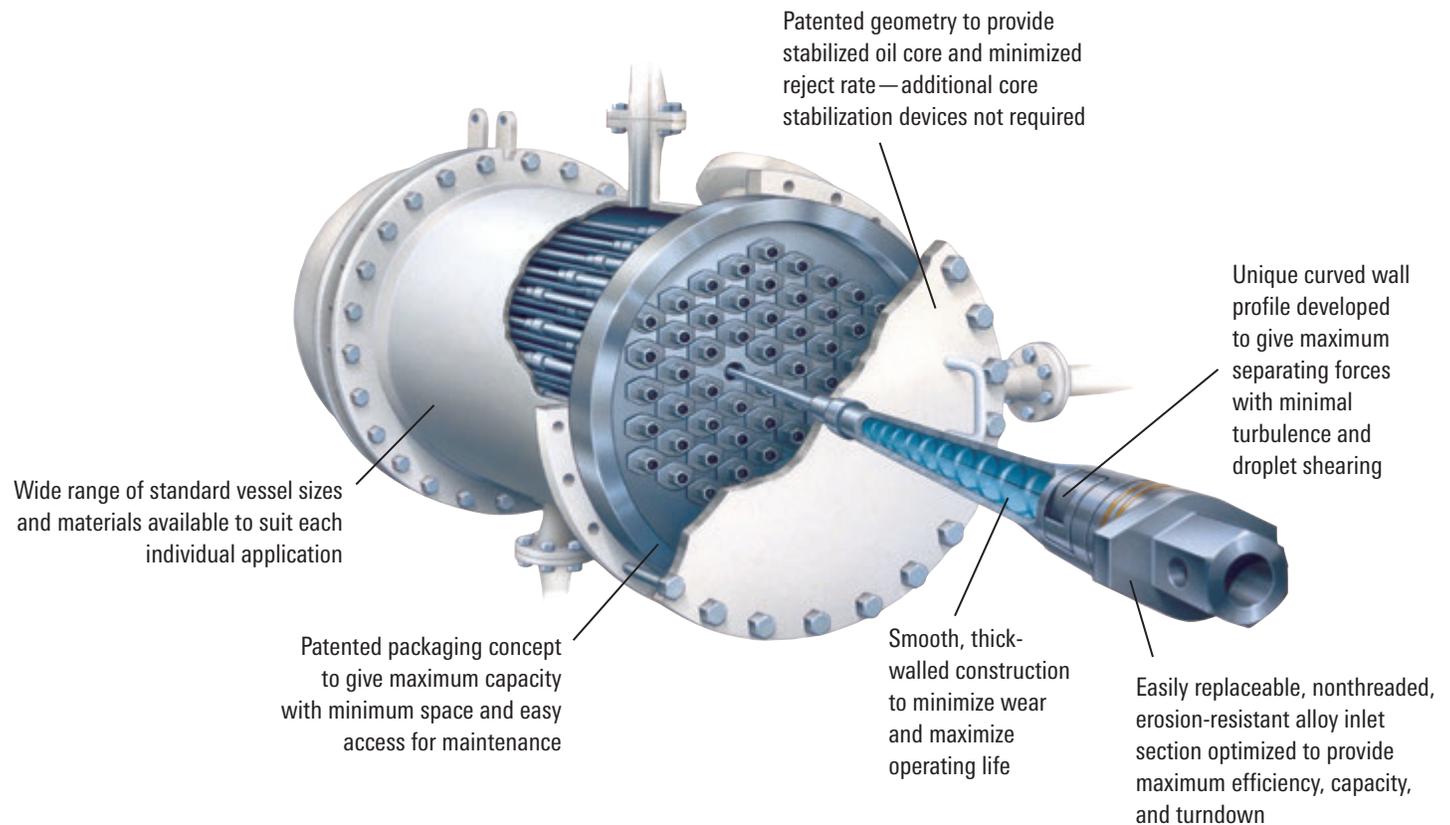
- For high-capacity applications, the larger-diameter VORTOIL G Series hydrocyclone provides high throughput and performance with minimal footprint, weight, and cost.
- For high efficiency, the smaller-diameter VORTOIL K Series hydrocyclone makes it possible to handle the most difficult of separations. This cyclone is recognized as the industry benchmark against which all other hydrocyclones are compared.

- For large-turn-down applications, a single vessel divided into multiple compartments can be provided. This is ideal for variable flow rate systems such as test separators. The vessel is segmented, enabling groups of liners to be turned on and off individually.
- To improve the operation and performance of existing hydrocyclone systems, we can retrofit any existing hydrocyclone vessel with the more efficient and higher-capacity VORTOIL hydrocyclones.
- Hydrocyclones can be packaged with other Schlumberger technologies to meet the stringent environmental discharge limits.

## Installation examples

### Oil production

- Fixed platform for Shell, offshore UK, North Sea
- Floating production vessel for Esso in the Balder field, offshore Norway, North Sea
- Floating production, storage, and offloading (FPSO) vessel for BP in the Schiehallion field, northern Atlantic Ocean



*VORTOIL hydrocyclones are designed to operate at process pressure, thereby optimizing system design, and their pressure vessel containment eliminates unwanted atmospheric emissions.*

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