

# ToreScrub

## Sand handling package

### Collect and clean sand from live process vessels

The Tore™Scrub is a cyclonic separator designed to receive and clean sand slurry from vessel desanding internals. Slurry flow from upstream vessels is controlled by the package and fed to cyclone liners, separating the sand from the water and retaining the sand for cleaning and disposal. Compatible with all desanding internals, the system allows tanks, separators, desanders, and other treatment vessels to be desanded without disruption to the process and protecting the operators from hazards. Combined with Tore™OVD in the upstream vessels the ToreScrub provides the safest, most reliable, and least disruptive method of vessel sand cleaning.

#### Benefits:

- Proven worldwide
- Allows frequent desanding of vessels without production loss
- Cleaning cycle removes oil from sand and displaces hydrocarbon rich water from the collected sand
- Isolation of collected sand from live process during disposal operation maximizing safety to the operator
- Level of automation optimized to your requirements to minimize manual interventions
- Control and sequencing provided that prevent blockages and maintain performance
- Training and support to keep you running

#### Design specifications

Parameter	Value
Slurry capacities	40-80 m <sup>3</sup> /h*
Compatibility	ToreOVD, jetting, and other vessel desanding systems
Holding volume	1-2 m <sup>3</sup> *
Typical pressure ratings	150# to 900#*
Discharge sand quality	< 1 g oil / 100 g sand
Slurry discharge pressure	1-5 barg*

\* Typical values. Just let us know your requirements.



Ask us about good practice for slurry handling and piping design

# ToreScrub

## Operation:

### Vessel desanding mode

Sand slurry is fed to the liquid filled ToreScrub vessel and passes through the ceramic cyclones. The spinning action inside the cyclones creates large forces that remove the solids from the water stream, dropping them into the holding volume below the cyclones. The vessel is typically designed to the upstream design pressures and the slurry flow into the vessel is controlled by a valve on the solids-free vessel outlet stream avoiding valves or pumps operating in abrasive environments.

Individual sections of upstream vessels are sequentially desanded at full process pressures without halting production until the vessels are sand free or the ToreScrub has filled with sand.

### Sand cleaning mode

Once filled with sand, the ToreScrub vessel is isolated from the upstream process and the cleaning cycle is run until the sand has had oil stripped from the surface and the oily water has been displaced with discharge quality water. In the cleaning cycle the held sand inside the ToreScrub is fluidized using Tore™ technology and a jet-pump on the package is used to suck the fluidized sand from the vessel and push it back through the cyclones at the inlet of the vessel. The high centrifugal forces and shear in the jet-pump and cyclones strip the oil from the surface of the sand and releases it into the water. This oily water is separated from the sand by the cyclones and passes to the outlet of ToreScrub vessel for treatment elsewhere.

### Disposal mode

After cleaning the sand, utility water is used to fluidize the sand and push the clean sand from the ToreScrub to a filter bag, skip tank, or overboard.

Reliable sand handling packages require good control and integration of upstream sand removal systems and appropriately designed pipework. Ask us for more details and advice.

## Integrates readily with:

- ToreOVD installed in upstream vessels and tanks
- Tore™Trap produced water desanders
- NOV bagging frames, filter bags, and transport containers for recovered sand
- Jetting and other sand systems



Figure: ToreOVD installed in a separator for connection to a ToreScrub



Figure: NOV ToreScrub rental unit for temporary vessel desanding

## Applications:

- Offshore collection and cleaning of sand for overboard discharge meeting local discharge regulations
- Onshore collection and cleaning of sand to reduce transport hazards and enable open handling of solids
- Rental ToreScrub units for temporary sand removal after unexpected sand break-through, where sand removal internals are already fitted



Figure: Sand bagging station and transportable containers