



# Mobile desander & sand cleaning package

## Desand live production separators and produced water

NOV has available for rental dual purpose sand handling units capable of undertaking desanding and sand cleaning operations. Versatile design enable the units to be utilized for either function due to the innovative solid/liquid cyclone arrangement on the vessel in each unit. The units are skid mounted for ease of transportation, installation, and demobilization, and available for short-term or long-term rental. If you already have desanding internals fitted inside your separator (e.g. Tore™OVD or jetting) the unit can be hooked up to receive sand from the vessel without pause in production, while offering protection to the operator from hazardous materials and live system pressures.

Each package comprises a vessel which is a variation on a typical Tore™Trap cyclonic desander and Tore™Scrub sand cleaning unit. The vessels are designed with two separate top sections that allow the vessel to be used as both a desander and sand cleaning unit. The top sections contain ceramic cyclones which remove solids from the liquid and a bottom accumulator section that stores the removed sand. The main top compartment contains 3 ceramic cyclones which are used during de-sanding operations. The second top compartment contains a single cyclone that is used in the sand cleaning cycle and can also be used in combination with the cyclones in the main top section for desanding.

A Tore™ device is fitted in the bottom of the accumulator section and is used to re-circulate sand during the cleaning cycle and remove sand from the vessel via the external disposal line.

### Benefits:

- Separator can be desanded without taking the vessel offline
- Allows more frequent desanding of vessel, maximizing separator performance
- Sand is isolated from production before discharge, protecting operators
- Produced water can be desanded without use of disposable cartridges
- Provides the functionality of a permanent sand handling system, without the capital expense

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desanding internals for your  
next shutdown



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## Process description

### De-sanding mode

In desanding mode, the unit can receive well fluids directly from the wellhead, produced water from separator vessels, or slurry from ToreOVD / jetting.

In operation, fluids enter the vessel and pass through the cyclone compartment(s). The desanded fluid exits from the top of the vessel and returns to the installation's existing separators or produced water facilities.

The removed sand particles drop to the bottom accumulator section of the vessel. The operator has the option of continuing to desand while operating the Tore in the base of the accumulator section to remove accumulated sand, providing there is suitable disposal option for the removed sand. Alternatively, desanding operations can be stopped when the accumulator section fills and the high level alarm point is reached, illuminating a beacon - the unit can then be switched to sand cleaning mode.

Flow to the two cyclone compartments can be configured to use both (4 cyclones) or either of the two compartments (3 or 1 cyclones). A twin globe valve arrangement on the fluid discharge line allows the flow/pressure drop across the vessel to be regulated and so maintain package performance, flow rates, and differential pressure across the cyclones, which can be observed on local indicators.

### Sand cleaning mode

A cleaning mode is used to remove oil from the accumulated sand prior to its removal from the vessel and eventual disposal. Desanding operations must be stopped and the flow through the vessel reconfigured to re-circulate the sand from the base of the

vessel, through the jet pump, to the single cyclone section, and back into the accumulator. The sand is circulated around this circuit for a predetermined time or until a sample indicates the sand has reached the required standard.

The Tore in the vessel is used to fluidize the sand thereby allowing it to circulate to the jet pump. The high gravitational forces and attrition set up in the jet pump and the cyclone act as scrubbing devices on the sand particles, removing oil from their surface. The removed oil leaves the vessel as oily water via the fluid discharge line to a suitable low-pressure destination.

Operating as a ToreScrub, the unit is designed to clean sand to the typical standard of <1% w/w oil on sand.

The Tore and jet pump require a feed water supply to operate. There is a common feed water supply header with individual lines containing isolating valve, flow indicator, and regulating manual globe valve to each device. The Tore feed flow rate should be set to 4 m<sup>3</sup>/h and the jet pump to 12 m<sup>3</sup>/h.

### Sand disposal

For sand disposal valve sequencing is changed, and the Tore is used to remove the accumulated sand and discharge it via the slurry disposal line to an external storage or disposal system. The length of the sand disposal period is manually timed and will depend on operating conditions. For a full load the period will be up to 55 minutes to remove sand and flush the discharge pipe-work.

## Design specifications

System design and operating parameters	
Dry / operating / test:	6.5 / 9.0 / 7.9 T
Dimensions	2.3 x 2.3 x 4.7 m
Design pressure:	FV/46.5 barg. 300# flanged rating
Design temperature:	+1°C to +93°C
Sand holding capacity (bulk):	1 m <sup>3</sup>
Internals:	4 x 4" cyclone liners 2 compartments, 3 + 1
Inlet flow range:	19.8 – 89.1 m <sup>3</sup> /h
Operating pressure range:	2 – 25 barg
Operating temperature range:	5°C to 88°C
Pressure drop across cyclones:	0.35/3.45 barg

Sand cleaning	
Total feed water supply:	16 m <sup>3</sup> /h at 8 barg
Tore feed water flow rate:	4 m <sup>3</sup> /h
Jet pump feed water supply:	12 m <sup>3</sup> /h
Pump discharge pressure:	2.25 – 2.75 barg

Sand disposal	
Tore feed water flow rate:	4 m <sup>3</sup> /h

