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Hydrocyclones

Desander

Introduction

Desander Hydrocyclones are used to provide efficient and reliable separation of sand and solids from Produced Water, Condensate and/or Gas streams. They have proven to be a valuable part of many Oil and Gas production facilities, by providing:

- High Efficiency Solids Removal,
- Compact, small footprint,
- Cost effective protection against erosion damage,
- No moving parts and minimal maintenance,
- Highly consistent performance.

Description

SUEZ's CYCLONIXX® range of Desander Cyclones are static cyclone separators commonly used for continuous sand and solids removal from Produced Water, Condensate or Gas streams. They are supplied either as single-liner units, or as multiple-liner configurations inside vessels.

The Cyclone Liner size and type selected is dependent on the process fluid, temperature, pressure and the concentration and type of solids present in the Liquid (Water or Oil) or Gas stream.

Small Diameter (2"/50mm), High Efficiency CYCLONIXX Desander Cyclones are typically constructed of ceramic materials to provide excellent erosion resistance, while larger units are made from specialised organo-metallic compounds, to provide erosion protection.

Operating Principles

Desander Cyclones are pressure-driven separators that require a pressure drop across the unit to cause separation of the solids from the bulk phase (water, oil or gas, etc).

The inlet stream (containing solids) enters the cyclone through a tangential Inlet Section under pressure, where it is forced into a spiral motion by the cyclone's internal profile. The internal cone shape causes the spinning to accelerate, which generates high centrifugal forces, causing the denser solid particles to move to the outer wall of the Cyclone, while the Water/Oil/Gas is displaced to the central core.

CYCLONIXX® Desander Package

SUEZ – Oil & gas systems
(incorporating Process Group)
Australia - Korea - Middle East - Singapore - USA

www.processgroupintl.com

Represented by:

Hydrocyclones
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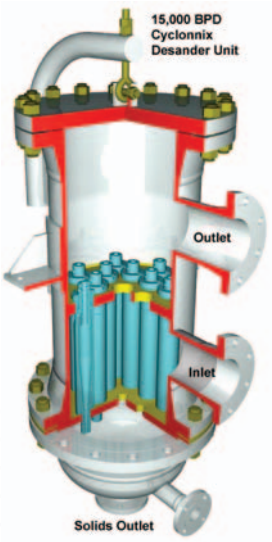
Solids continue to spiral down along the outer wall of the conical section inside the Cyclone to the Outlet or Underflow, where they exit. It is typical to collect the solids in a closed underflow container or vessel, and periodically dump these solids.

De-sanded Water/Oil/Gas in the central core section reverses direction and is forced out through the central Vortex Finder at the top of the Cyclone as the Overflow.

Schematic of Desander Vessel:



Technical

Factors involved in the selection of Desander Cyclone are:

- Desired particle size removal (in micron)
- Temperature/Viscosity of the Water/Liquid,
- Liquid density
- Solids density
- Volume to be treated,
- Available pressure/pressure drop to drive cyclone

Particle Size Removal:

The rule in selecting a Desander cyclone size is that smaller cyclones remove smaller particles.

Temperature/Viscosity:

Temperature of the water/liquids is very important, as higher temperature reduces liquid viscosity, which improves separation by reducing the drag forces on the particles.

Liquid Density:

Water Density is ~1.0, although it varies slightly according to temperature, salt concentrations, etc. Oil can vary from 0.6 - 0.99 S.G.

Solids Density:

The solids density seen in production fluids has a typical density ~2.2 - 2.65 S.G. This density directly effects separation potential, with higher density solids being more easily separated. There can be a range of different types of solids with a range of densities, although there is typically one major component.

Pressure drop:

Cyclones can be installed to operate at any pressure. They use pressure as the energy for separation, and the pressure drop (across the cyclone) required for solids removal is 15 – 70 psi. (1.0 – 4.8 Bar), as this range provides optimum performance, while minimising erosion and pressure loss.

Applications

- Removal of abrasive solids from process piping to minimise maintenance on pumps, control valves and other process equipment.
- Sand removal from process to minimise Separator sand build-up, to improve Separator efficiency (more residence time), and to reduce or eliminate shut-down maintenance to remove sand, etc.
- Solids removal for water reinjection to prevent formation blockage and damage to pumps,
- Removal of heavy metals from process liquids (condensate and/or water) to comply with environmental or sales requirements.