

Oily Water / Produced Water Treatment

Sand Wash Package



Product Application:

- Wellhead solids removal in multiphase flow
- Protection of equipment from blockage or erosion
- Sand cleaning for overboard discharge
- Polishing of water prior to re-injection

Materials of Construction:

- Stainless Steel
- Alumina Ceramic
- Polypropylene
- Tungsten Carbide
- Reaction Bonded Silicon Carbide

Hydrocyclone Theory

Hydrocyclones are effectively gravity separators that rely on the differential density between the particle and the water to allow separation.

The efficiency of the separation is governed by five main factors:

1) Droplet / Particle Size

According to Stokes' Law this is the biggest factor that affects gravity based separation. A hydrocyclone is ultimately a proportional separator.

Any single type of hydrocyclone will separate a given percentage of solid particles of a certain size for a given set of process parameters. This is the profile of the hydrocyclone.

2) Differential Density

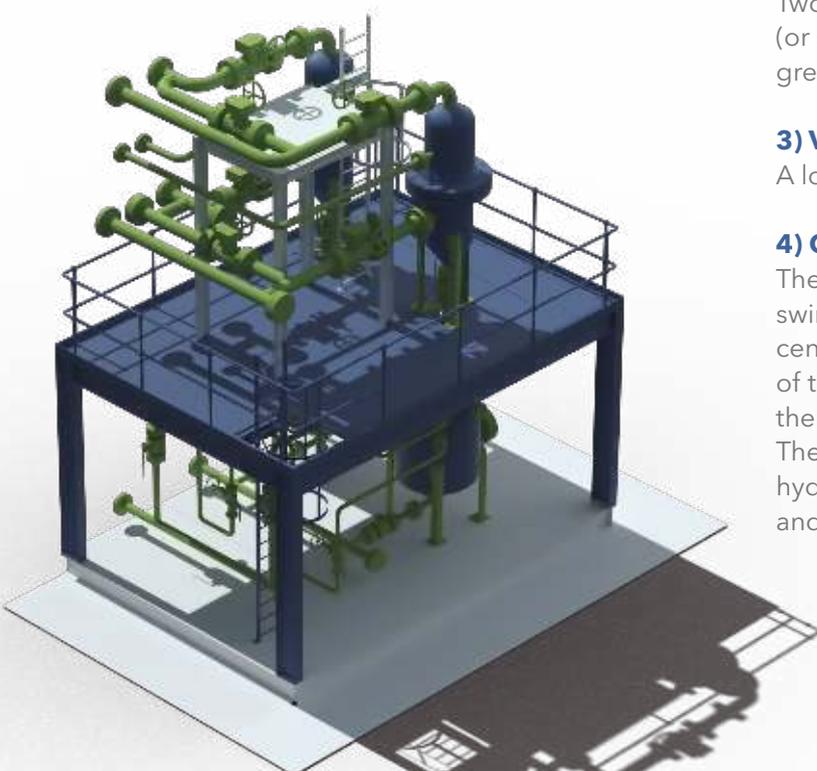
Two different products will only separate due to gravity (or other forces) if there is a difference in density. The greater this difference the easier it is to separate them.

3) Viscosity of the Bulk Fluid

A lower viscosity will result in easier separation.

4) Gravity (or Centrifugal Force)

The hydrocyclone has a tangential inlet. This creates a swirl in the hydrocyclone. The swirl and consequential centrifugal force is increased by the circular velocity of the water. This is caused by a higher flow rate in the hydrocyclone and hence a higher pressure drop. Therefore unlike all other gravity separation devices the hydrocyclone performs better with higher flow rates and hence lower residence time.





Process Description

The Peerless sand washing package is designed to treat sand jetting water originating from the upstream separator vessels. These vessels will be internally-fitted with a sand jetting system.

The inlet stream with high solids content passes through the desanding section of the sand wash vessel containing the desanding hydrocyclone liners.

In this section the solids are separated from the bulk water, then these solids fall by gravity into the sand wash vessel accumulation section while the bulk water exits the package via the flow control valve.

The flow of water through the desanding hydrocyclone is maintained constant. Flow control is achieved using a control valve located in the water outlet stream, this valve maintains constant differential pressure drop across (hence constant flow) the desanding liners irrespective of the operating pressure of the upstream separator vessel.

Over time the level of solids in the accumulation section of the sand wash vessel will increase and will eventually require cleaning and removal. The sand washing process can be initiated based either on the level of accumulated solids or on a set cyclic basis.

Leaving oily solids in the vessel for long durations (greater than 24 hours) is not recommended, due to their sticky nature this can lead to difficulties in removing the solids.



During sand washing the vessel is isolated from the upstream separators, wash water is used to recirculate the accumulated solids through the desanding hydrocyclone liners.

Field Trials:

- Small scale trials are simple
- Can provide accurate picture of treatability of fluid
- Single liner trials fully scaleable
- Suitcase size liner trials

