



SOLIDS HANDLING

Hydrocyclone Separation, Cleaning, Storage, Transportation

Solids handling in the oil and gas industry is an increasingly important task, and an efficient process dealing with the problem needs to address sand removal from produced water streams, and the effective removal of all solids from multiphase flows, upstream or downstream of the choke.

A hydrocyclone based process system provides the most cost effective solution to solids separation, cleaning, storage, and transportation.

Desander hydrocyclones are pressure drop dependant, where either two or three phase fluids are directed into the desander tube causing the fluids to spin under a centrifugal force. These strong forces cause the solids and liquids to separate.

Where gas is present, it disengages and also separates quickly. The heavier solids are forced outward toward the cyclone wall, and the lighter liquids and gas phases migrate in the opposite direction toward a centre core.



Solids spiral down the cyclone to the underflow outlet, while the remaining fluids are forced in the opposite direction to the overflow. The process is a simple and effective separator, with a 2-3 second retention time, and no moving parts.

Benefits:

- No moving parts, low maintenance and little downtime requirements, result in significant capital and operating cost savings;
 - Compact; 10% of the size and weight of conventional filter systems allow for ease of mobilisation;
 - Activates oil and gas wells previously shut-in due to excessive sand production;
 - Eliminates solids erosion on downstream process equipment including pipework, valves, chokes, and process vessels;
- Provides solids removal prior to oil contamination and eliminates sludge formation and other difficult solids accumulation problems in separators and other pressure vessels;

Operations:

- Desanders are available in many sizes. Systems used in oil and gas production are typically in the 1 to 10 inch range, separating 98% of particles from 5 to 50 microns and larger;



- Operating pressure drop requirements vary from 5 to 100 psig, with the larger desanders units handling solids volumes of up to 20% and the smaller units handling up to 1-2% by volume;

- Produced water streams contain less than 1% sand in water, and typically contain between 500 to 1,000 ppm. At these levels a desander will typically reduce solids loading to 10 to 20 ppm;
- In full wellstream applications a desander will separate all solids up to 99% by weight;



Cleaning, Storage & Transportation:

- Solids are typically collected into dedicated secondary accumulator vessels. For high operating pressures, these are typically closed systems, and are used to prevent high quantities of gas flashing to atmosphere during the purge cycle. For low pressure applications an atmospheric tank will suffice;
- Solids cleaning is performed by a closed loop cyclonic co-current process system carefully designed to ensure adequate scrubbing through turbulent flow operation;
- To ensure liquids content in the final batch are minimised, water is reduced by the use of overflow tank designs. The solids remain, and the water is collected and pumped to a slops tank. The final sand slurry is typically >80% solids by volume;
- The collected solids are removed either by tank replacement, or by vacuum truck operation;

