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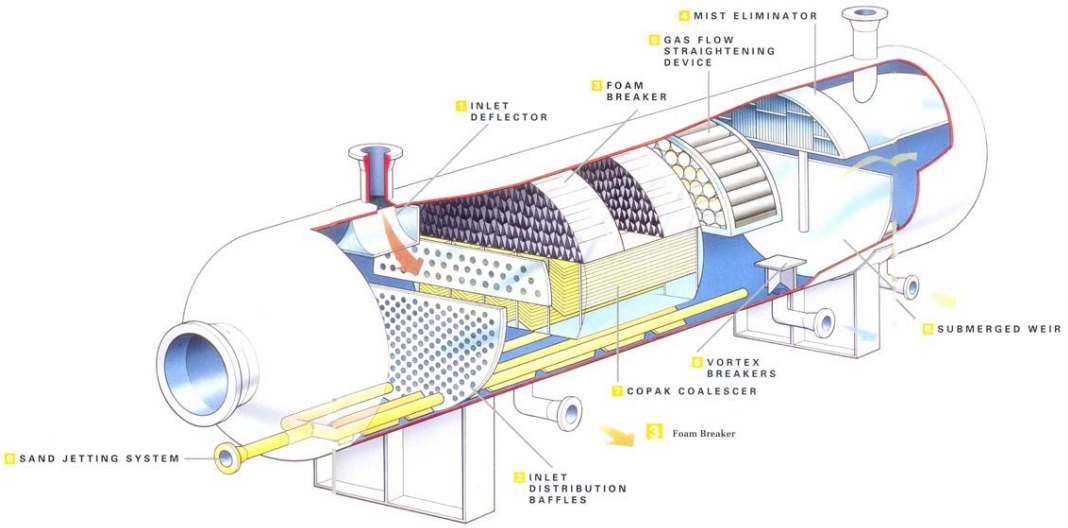
ISO 9001:2008
ISO 14001:2004
ISO 18001:2007

Production and test Separators

How it Works

The purpose of the separator is to divide the three phase inlet gas-oil-water stream into separate phases. A gas phase free of liquid droplets, an oil phase free of gas carryover and water droplets and a water phase free of gas carryover and oil droplets. Test Separator units also usually provide metering of the different product phases.

Gas/liquid separation in mechanical separation vessels is a gravity function. The operative principles are the Stokes–Cunningham relationships based on density differences. Various mechanical features and devices are employed to enhance, accelerate or otherwise improve the efficiency of the process. Based on the process duty data specific to the application the following internal features may be selected for separator design.



1. Inlet Deflector (Top Inlet Type)

The Inlet Deflector is a momentum absorption device which aids initial separation without increasing turbulence. The inlet stream entering through the inlet nozzle is smoothly divided into two equal streams each of which is deflected to give a primary centrifugal separation effect. The bulk of the entering liquid flows gently into the continuous liquid phase as a result of the inlet deflector.

2. Inlet Distribution and Wave Breakers

Immediately after the inlet deflector, the liquid passes through as special design of distribution baffle that acts to dampen adverse liquid waves and surges that may be caused by incoming slugs. After leaving the initial distribution baffle the liquid enters a settling zone in which gravity separation causes entrained gas bubbles to raise the oil/gas interface and join the continuous gas phase. Addition wave

breakers along the vessel ensure the continued dampening of any waves. Gas flow straightening device are sometimes used where gas velocities are high.

3. Foam Breaker

High surface area internals in a variety of grades and styles are utilized for foam breaking application. In clean service, wire mesh product can be used with good effect, but in fouling service a non-clogging form of corrugated plate device is required. Velocities through the pack and the oil viscosity and surface tension govern the choice of plate style, spacing, thickness and drainage slope.

4. Mist Eliminator

Coalescence of the remaining liquid droplets in the gas phase takes place in a mesh or serpentine vane type mist eliminator. This is an impingement type. Low pressure drop, low turbulence device usually mounted vertically a short distance upstream of the gas outlet nozzle.
Standard NAPEEC separators can be expected to achieve the following performance when correctly installed operating:

Performance

- Removes 98% of all liquid droplets above 10 microns diameter from the gas
- Achieves oil in water performance <0.1 % carryover
- Typical water in oil performance between 1.0 % to 5.0 % carryover
- Clean pressure drop less than 1.5 psi (0.1 bar) across the gas connections
- Stable turndown to less than 10 % of design flow

5. Vortex Breakers

The Separated liquids are drawn from the bottom of the vessel at the furthest possible position from the inlet. NAPPEC's effective vortex breakers ensure that oil is not contaminated with gas nor the water with oil.

6. Submerged weir or oil standpipe

The submerged weir is the most effective method of ensuring minimum contamination of the product water and oil. The heavier water layer is held behind the weir and only the upper and cleanest part of the oil layer flows over to the oil outlet compartment. However, to handle a large flow range of both the oil and water phases as well as possible surging flows, a standpipe oil outlet device is sometimes used instead.

7. Oil/water coalescing internals

To meet some stringent process guarantees it is occasionally necessary to fit coalescing media which will maximize the coalescing interfacial area. NAPEEC have developed a range of CoPak ^{TM} coalescing media for this purpose. The packing is manufactured in profiled sheets making it light weight and best suited for this application. Optional styles of CoPak ('V' Plates or Fluted Packing) offer alternative method for liquid droplet to impinge on the surfaces allowing coalescence to take place.

8. Sand Jetting

A sand jet sparge pipe can be fitted along the bottom of the vessel running up to the weir plate. High pressure water is used to fluidize any solids settled in the base of the vessel so that they may be flushed away to drain. A sand pan to prevent clogging and blockage of nozzles is also available, together with a sand retention baffle.