Production Separator

Three-phase separator is a basic component of petroleum production system, which is used to separate reservoir fluid from oil, gas and water. Then these separated flows are transported to the downstream for processing.

In general, a mixed fluid can be considered as a small amount of liquid A or gas B dispersed in a large amount of fluid C. In this case, the dispersed liquid A or gas B is called the dispersed phase, while the large continuous fluid C is called the continuous phase. For gas-liquid separation, it is sometimes necessary to remove tiny droplets of liquid A and C from large amount of gas B, where gas B is the continuous phase, and liquid A and C are the dispersed phases. When only one liquid and gas is considered for separation, it is called a two-phase separator or a liquid-gas separator.

The basic principle of separator is gravity separation. By making use of the density difference of different phase states, the droplet can settle or float freely under the combined force of gravity, buoyancy, fluid resistance and intermolecular forces. It has good applicability for both laminar and turbulent flows.

The separation of liquid and gas is relatively easy, while the separation efficiency of oil and water is affected by many factors:

- The higher the viscosity of the oil is, the more difficult it is for the molecules of the droplets to move.
- The more evenly oil and water are dispersed in each other’s continuous phase and the smaller the droplets sizes are, the greater the separation difficulty is.
- The higher the degree of separation is required, and the less liquid residual is allowed, the longer time it will take.

Application

- Early Production Facility
- Crude processing & treatment facilities
- Gas processing & treatment facilities

Design Code & Standards

- ASME Section VII, DIV 1
- NACE MR0175
- UL, Exp
- PED
- CE
- API 6D
- ANSI B31.3 Class M (H2S)

Features

- Special design and certification for onshore and offshore
- Special skid & piping design for easy and safe operation
- Durable internals & analyzers
- Certified and reliable flow control valve and instruments
- Instrument gas scrubber
- Sample points for oil, gas, water and inlet medium
- High / Low alarm points and pressure relief valves
Three-phase Separator

Production Separators are used in crude oil treatment and production for efficient separation of oil, gas and water. Depending on the working medium, Production Separators can be classified as Two-phase separators or Three-phase separators. Production Separators usually supplied with high-accuracy and durable instruments, control and shut-off valves, piping and skid, and referred as Production Separator Module / Skid. Separator vessel is equipped with internal components, such as inlet deflector, vane pack, coalescer, wave breaker, weir plates, and mist extractor. Some projects require separator with heating system, usually electric-type, in order to prevent waxing and emulsion-control. Control and Automation system usually supplied by the vendor of the separator for client’s convenience and for fast oil production.

Depending on the handling capacity and place of operation, can be designed for ground installation, mainly used for onshore production, or modular-designed used both in offshore or onshore, either in standalone item or part of the package, and designed to fit the trailer for ensure fast and effective mobility during operation.

Some of the well fluid treatment facilities, use High-pressure (HP) and Low-pressure (LP) Production Separators to achieve maximum efficiency of gravitational separation.

Basic Specification Data

Separator can be designed as per client’s operation conditions depending on flowrate, temperature, pressure, working medium and other operation data. Most of the production separators are designed for comparatively big capacity of 6000-20000 BOPD.