

Vertical Gas Separators

Vertical Gas Separators: High efficiency two stage separation for maximum performance at low pressure drop

Grand Prix Vertical Gas Separators are designed for the removal of large amounts of liquids, and will effectively arrest liquid slugs. It is a two stage separator consisting of a settling chamber and distilling baffles at the first stage, and the hook less vane element at the second stage.

The vane element is designed for maximum performance at low pressure drop. It is based on an aerodynamic flow concept which eliminates hooks extending into the flow stream by utilizing troughs which are flush with the side of walls of the vane plates. These troughs provide a high liquid removal capacity and positive isolation of the separated liquid.

Principles of Operation

Grand Prix vanes consist of a labyrinth formed by parallel plates with side troughs for the collection of liquid residue. A high liquid to gas ratio two phase flow can be considered as a liquid saturated with gas system. As such small gas bubbles are entrained in the liquid, these bubbles must be released. If a high liquid/gas separation is desired, it is essential that adequate primary separation be provided so that the separating element is not overloaded.

The first step in primary separation is to control the momentum of these fluids. The Grand Prix vertical gas separator uses an inlet baffle which induces a weak centrifugal action which moves the liquid to the vessel wall while at the same time flow downward where its momentum is reduced by a series of baffles which minimize splashing of the liquid while releasing the vapour into a low velocity chamber.

This chamber is formed by a secondary row of baffles that causes a small flow resistance across them, aiding in the distribution of the gas across the entire vessel area and keeps the liquid quiescent. While the bulk of the liquid is removed the vapor will continue to carry small liquid droplets which can not reach terminal velocity within the vessel.



The second stage hook less vane, which is located at the outlet of the separator and several feet above the liquid level, will remove the small droplet remaining in the gas stream.

This element consists of a series of parallel plates with side troughs for the collection of the liquid residue. The liquid-laden vapour approaching the vane plates are forced to change direction several times, with some degree of centrifugal action introduced as the change occurs. The heavier liquid droplets are then thrown against the wetted walls, converted the droplets to sheet flow. Coalescence of small particles is accomplished by two mechanisms –agitation and surface contact (the vane surface is wet and small particles striking it are absorbed).

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The agglomerated liquid then travels to the troughs which are perpendicular to the flow of the gas and from there is drained into the sump.

Performance

Efficiency

Grand Prix Vertical Gas Separators are designed to perform at high efficiency while operating at a wide range of flows, and liquid loads will effectively arrest slugs and droplets as small as 5 microns. Efficiency is influenced by particle size distribution and liquid loading.

When particle size is below 5 microns a coalescer may be installed. This element is an integral part of the separator and will remove up to 99.5% of particles 1 micron and larger.

Features: Design & Construction Advantages

Standard Configurations

Vertical Gas Separators are available in standard in-line (inlet & outlet 180° apart) configuration or side inlet top outlet. Other orientations may be used to fit piping arrangement.

Mechanical Features

- ASME Pressure Vessel Code, Section VIII, Div.- 1, U Stamped and Div. 2 U2 Stamped.
- National Board or IBR certified
- Standard scrubbers are constructed of carbon steel (NACE or HIC Tested), however, separators can be custom designed and built from stainless steel and other steel alloys.

Applications

The Vertical Gas Separators are used in a variety of applications and are recommended for:

- Critical applications where high efficiency is essential such as removal of acids where small carryover will cause corrosion problems.
- The removal of light and/or low surface tension liquids where small carryover may cause catalyst poisoning or low product yield.
- The removal of large amounts of liquids from the gas streams.
- Removal of viscous liquid, or where high turndown from the gas flow design point is required.
- Steam service, for the removal of condensate and lubricating oil.
- The chemical and petrochemical industries for the recovery of product and for pollution control.

For more information on other Grand Prix products viz. Pressure Vessels, Strainers, Cartridge Filters, Dry Gas Filters, Cyclone Scrubbers, Filter Separators, Silencers and Skid Mounted Packages contact:

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