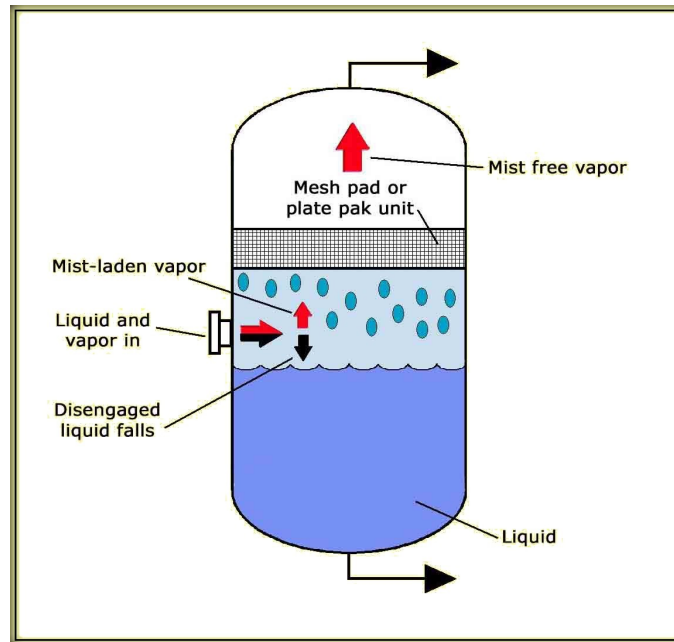


- 2 PHASE SEPARATION -



- GAS/LIQUID SEPARATION -

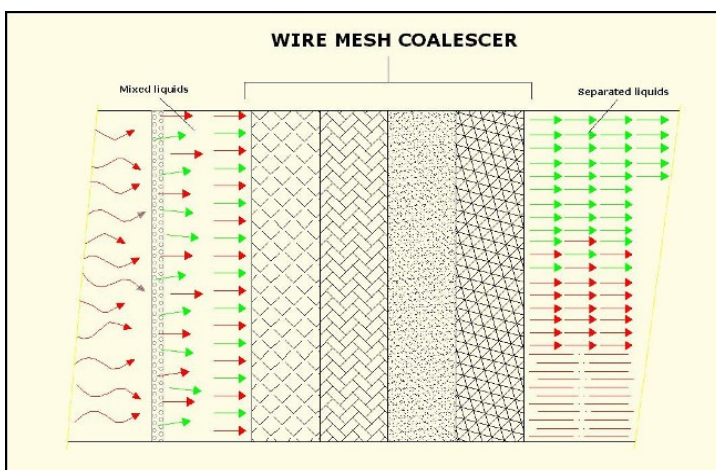
- **Wire mesh pads:** the metallic wire mesh layers form a very dense cellular structure. Passing through it, the liquid drops are captured by the coalescent effect of the mesh. Then they are eliminated by gravity.
- **Vane packs:** these separators are made with a variable number of vanes (with or without hooks). Vanes and hooks intercept and separate the liquid droplets passing through the pack.
- **Efficiency:** wire mesh separators can separate smaller droplets (usually till 3 microns of diameter) compared with vane packs (usually till 8/10 microns).
- **Velocity:** on the other side wire mesh demisters usually work with a very low velocity and vane packs can afford velocity very much higher

- LIQUID/LIQUID SEPARATION -

- **Wire mesh coalescer:** made by wire mesh as the demisters but with different kind of layers and a bigger thickness.
- **Plate pack separators:** made by parallel plates crossed by the liquid flow.
- **Velocity and performances:** as in the case of gas/liquid separation the wire mesh internal needs crossing speed lower than plate plate but allows higher performances.

Advantages:

- reduction of dimensions and costs of vessels
- increasing of the purification of products
- decreasing of the losing of glycol, ammine and other expensive chemical elements



- GAS/SOLID SEPARATION -

Some common application are:

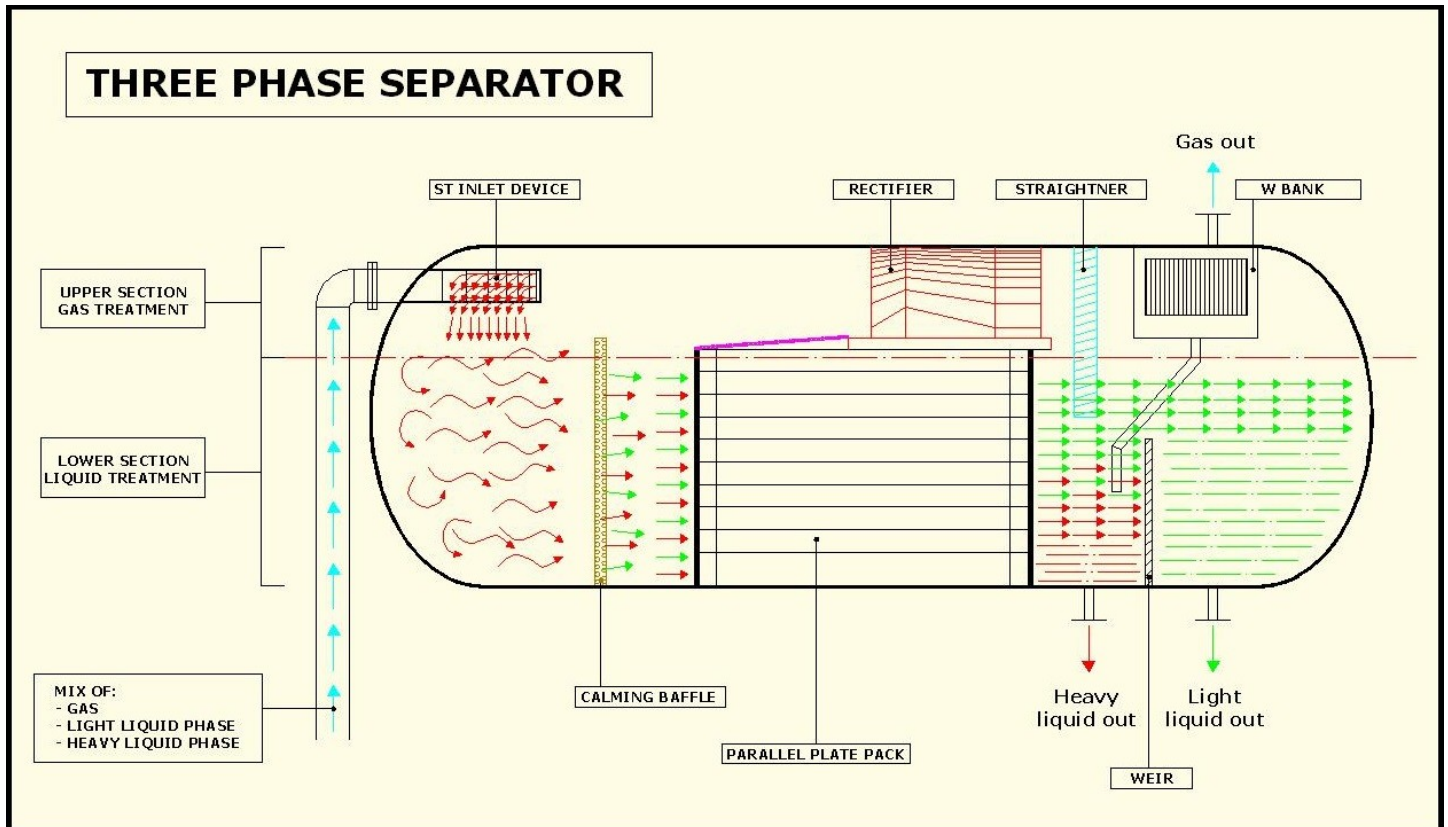
- desalination plants, where salt is separated from the air flow. The intercepted droplets of salt become solid inside the mesh pad and, after some time, the demister needs to be changed.
- air filtration and purification needed in a lot of different industrial and food process
- filtration of solid particulate coming from some mechanical processes like, for example, drawing of metallic wire.

- 3 PHASE SEPARATION -

The three phase separation consists in the treatment of a flowrate composed by three different phases. Usually one of them is in aeriform state and the other two are in liquid state. So, in general, we have:

- gas phase: as for example methane, hydrocarbon gas, natural mixed gas;
- liquid light phase: as oil;
- liquid heavy phase: as water;

The scope of the 3Ph separation is to obtain a gas flow without a big quantity of entrained liquid droplets and two separated flows of liquid light phase and liquid heavy phase.



PROCESS: In general a ST inlet separator is used to calm and distribute the flow at the entrance of the vessel and, to obtain the separation of the three phases, the flows are forced to pass through some internals at the same time but in two different sections of the vessel:

- the upper section where the gas flow is treated with, for example, a rectifier, a straightener and a vane pack.
- the lower section where the liquid flow is treated with, for example, a calming baffle, a plate pack coalescer and a weir

INTERNALS: the composition of the internal set can change on the base of the characteristic of the fluids and of the required performances. A sample of separator is, for example, the so called "Gravity separator", where the only used internal is usually a ST inlet device and there is not separation between the light and heavy liquid phase.

In other cases, to satisfy the required performances, some special internals are required. For example:

- a double calming baffle can be required instead of a simple one;
- a wire mesh coalescer can be required instead a parallel plate pack;
- a wire mesh demister is required instead a vane pack;

SIZING: the sizing of a 3ph separator and of the its internals is a complex process needing to consider some different parameters as:

- characteristic and property of the fluids as density, viscosity, chemical composition, molecular weight etc.;
- required residence time inside the vessel;
- required dimensions of the vessel on the base of location and other needs like, for example, existing piping;
- required performances of the process as, for example, the minimum diameter of the separated liquid droplets by the vane pack or the wire mesh demister.