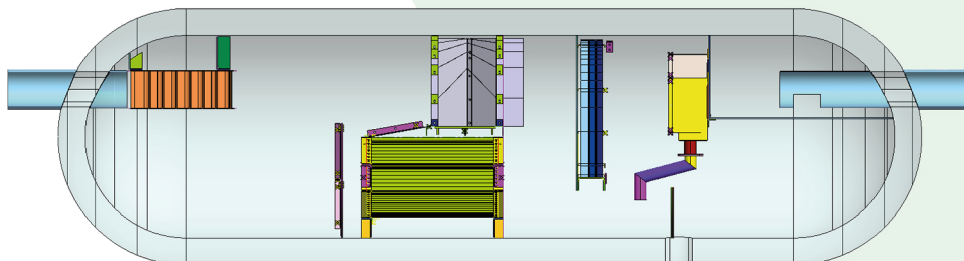


WIRE MESH SEPARATORS
and equipment for
COLUMNS, VESSELS AND PROCESS PLANTS





MAIN PRODUCTS



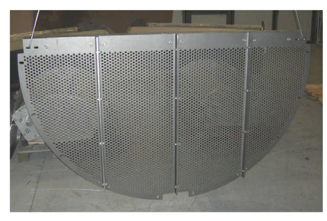
WIRE MESH SEPARATORS

Used when high separation performances and low pressure drop are required, as in chemical and petrochemical industry, desalinization plants, wine and food industry, biogas treatment, oil separation in screw compressors, drying plants, refrigeration plants or air treatment and air depuration plants.



ST INLET DEVICES

This kind of inlet device is often used in horizontal and vertical vessels. AFP Tech ST inlet device reduces the stress due to the flow to obtain a primary separation of the phases. Moreover it allows the treatment of an higher flow rate and the reduction of dimensions and costs of the vessels.



CALMING BAFFLES

This kind of perforated plates are commonly used to prevent the flow turbulences inside the treatment plants and feed the liquid into the settling compartment with a laminar flow regime. They are available with different sizes, diameter of holes and shapes according to the working conditions.



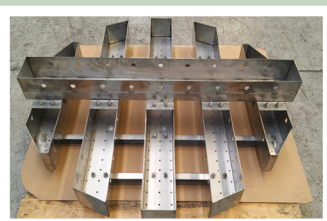
PARALLEL PLATE PACKS

This kind of internal is commonly used to separate a liquid-liquid mix exploiting the different densities of the two liquids. They are often used in many three-phase separators where the flow is composed of gaseous phase, heavy liquid phase (ex. water) and light liquid phase (ex. oil).



VANE PACKS

This kind of packs are used to separate liquid droplets carried by gaseous streams with a high crossing speed. It is composed of sets of vane profiles where the gas passes through and, changing direction, clashes on the vanes. The liquid droplets are drained down by a tube into the liquid section of the vessel.



SPECIAL INTERNALS

Candels, baskets, metallic wire meshes, air filters, special gratings, liquid distributors etc. Through close co-operation with some of the most important manufacturers in our region, we are able to supply also products widely used in chemical and petrochemical applications.



WIRE MESH SEPARATORS

Wire mesh separators are widely used when an effective separation between liquid and aeriform phase is essential to obtain low-cost and efficient industrial processes. This kind of separators have an alveolar structure of wire mesh obtained through the superposition of several layers of tubular sock. This sock is woven with extremely thin wires with a diameter inferior to 0,3 mm. This results in a structure with high free volume (usually > 95%), a wide active surface with a low density of the mesh, which saves costs and materials.

WIRE MESH SEPARATORS ARE WIDELY USED

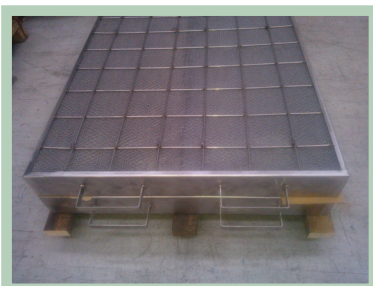
- > In gas purification plants.
- > To eliminate liquids that could damage the production processes.
- > To prevent problems to the plant structures.
- > To prevent emissions dangerous for the environment.
- > To recover expensive liquids.

SUPERFICIAL TREATMENT

Every welded material could be treated with a passivation process in order to eliminate all welding residue and avoid a corrosive effect due to an aggressive environment. To ensure the best quality of our products we have implemented a special tig brush cleaning system allowing us to perfectly clean every single weld.

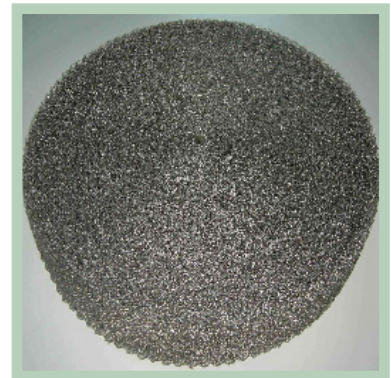
MATERIALS

AISI 304L, AISI 316L or AISI 314 always on stock. Special materials on request.



DEMISTERS FOR SCREW COMPRESSORES AND REFRIGERATION INDUSTRY

AFP Tech Srl produces different kinds of wire mesh demisters for the refrigeration industry and screw compressors. We can manufacture circular filters with holes in central or eccentric position and in different sizes and shapes. Customized wire mesh density and wire diameters are also available.



ADVANTAGES OF WIRE MESH SEPARATORS

- > Easy installation and moving through man holes and small spaces.
- > High efficiency of separation processes with low pressure drop.
- > Reduction of vessel dimensions with less working costs.
- > Less costs in comparison with other separation methods.



AIR TREATMENT

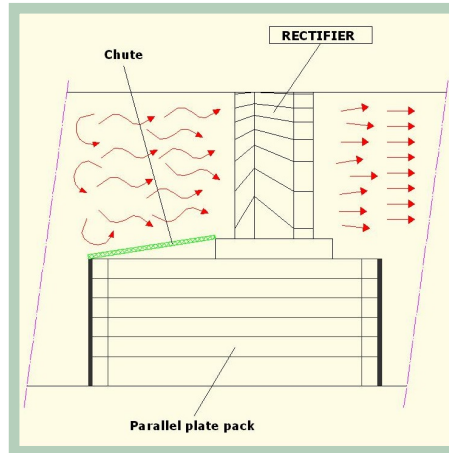
Air treatment plants often need a wire mesh separator usually installed in series with other filters, as for example filter cells, for a longer lifetime or to improve the efficiency of the filtration process. In both cases stainless steel demisters can provide high performances of separation, usually capturing small droplets, with a very low pressure drop.



WIRE MESH ROLLS

Metallic wire mesh is the raw material for wire mesh demisters but, the same material, it is used in different applications of many industry sectors, for example full metallic anti-vibrations, air treatment filters, automotive components like filters, anti-vibrations, separator rings, silencers, thermal insulators, anti-intrusion and anti-vandalism elements, cleaning of mechanical components etc.

RECTIFIER



This special kind of vane pack is made with vanes forming large canals to rectify the chaotic gas flow from the inlet.

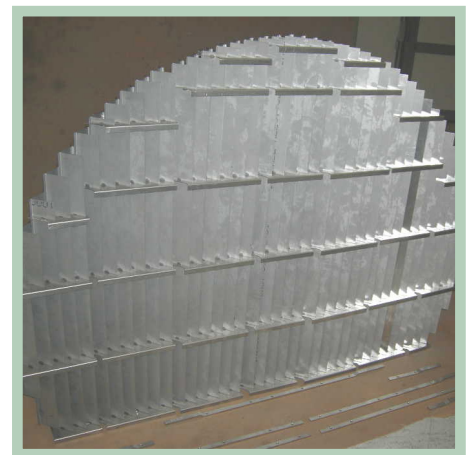
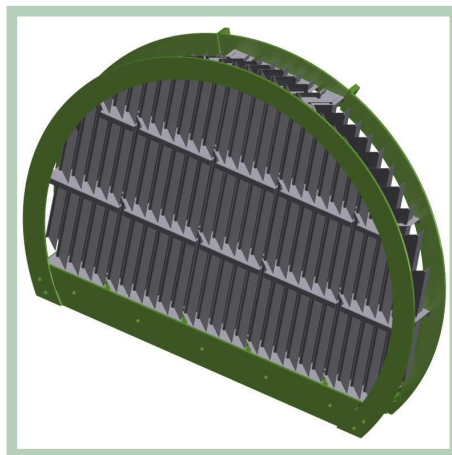
Passing through the rectifier, the gas is calmed and the flow rectified. This allows a proper distribution of the flow at the inlet of the other gas separator

as straighteners and vane packs. The rectifier is not designed to separate liquid droplets from the gas flow but only to calm the flow.

These elements are usually located over the parallel plates pack to intercept and redirect the gas flow. Usually, a “chute” is placed before the rectifier to intercept the gas and feeding it in the rectifier.

STRAIGHTNER

The straightener is a particular kind of vane pack used to break the foam and to calm the gas flow. This internal is often placed between a rectifier and vane pack separator or a wire mesh demister.

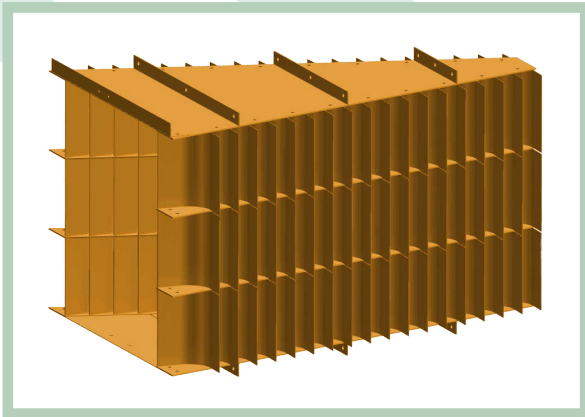


A secondary positive effect of the straightener is a primary coarse separation of the liquid droplets from the gas flow.

Usually the diameter of the straightener is equal to the vessel diameter but the remaining characteristics (kind of vanes, thickness, pitch of the vane etc) can be designed according to the process.

Usually the diameter of the straightener is equal to the vessel diameter but the remaining characteristics (kind of vanes, thickness, pitch of the vane etc) can be designed according to the process.

AFP ST INLET DEVICE



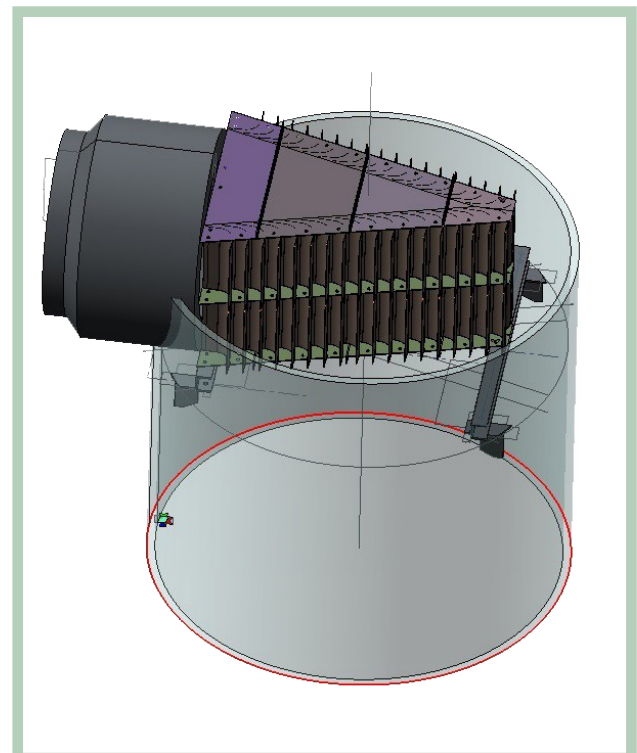
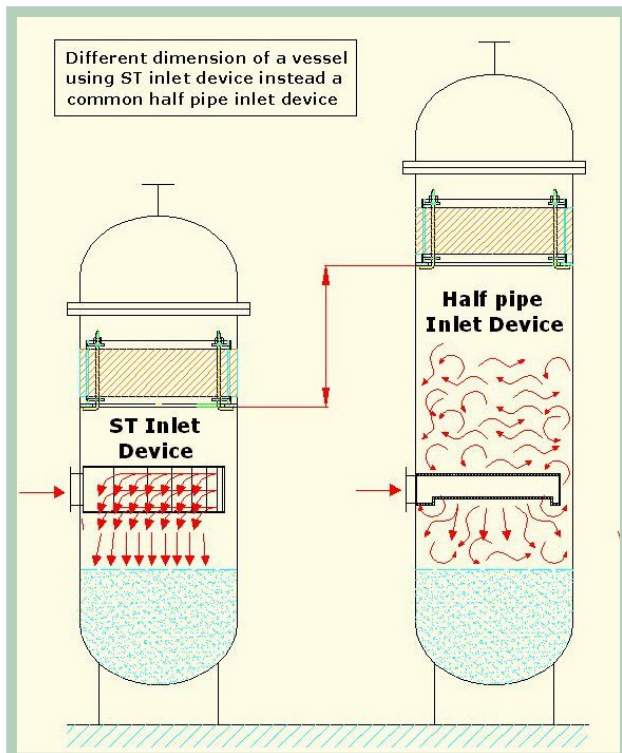
The AFP Tech ST inlet device is composed of one or more planes of vanes and two covers that allow the flow canalization through the slots in the vanes.

This kind of inlet device is widely used in horizontal and vertical vessels with a high inlet flow, composed of a mix of liquid and gas.

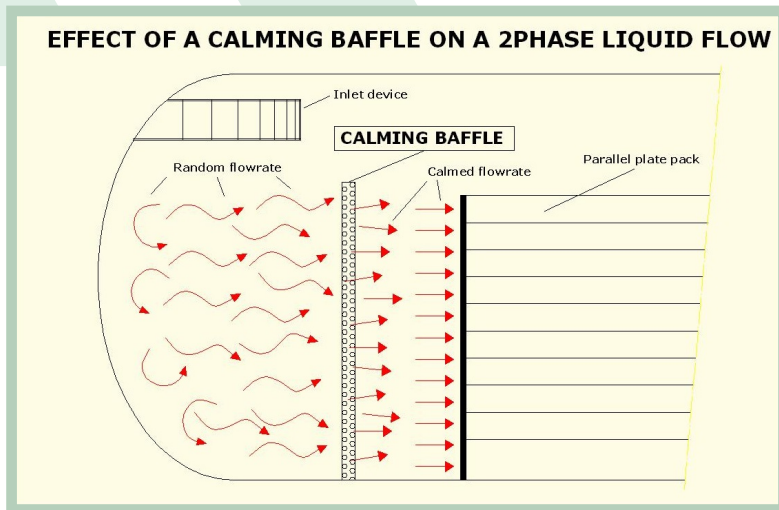
ADVANTAGIES

The main advantages provided by ST inlet devices are:

- > Reduction of the vessels dimensions with a significant saving of material, transport and installation costs.
- > Reduction of the diameter of the inlet nozzle.
- > Reduction of the stress due to the flow to obtain a primary separation of the phases.



CALMING BAFFLE



A calming baffle is a particular kind of perforated plate commonly used to prevent and eliminate flow turbulences in the treatment plants and to introduce the two-phase liquid flow in the settling compartment with a laminar flow regime, as in the picture below.

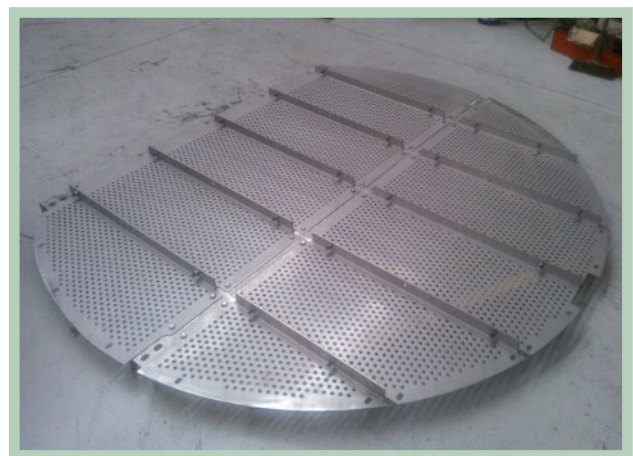
The calming process of the flow rate is very useful because it provides the best performances from the parallel plate pack located after the calming baffle: when the liquid flow enters with regular distribution and speed, the separation process can immediately start.

Without a calming baffle, the liquid distribution can be very chaotic and the performance of the plate pack decreases consistently.

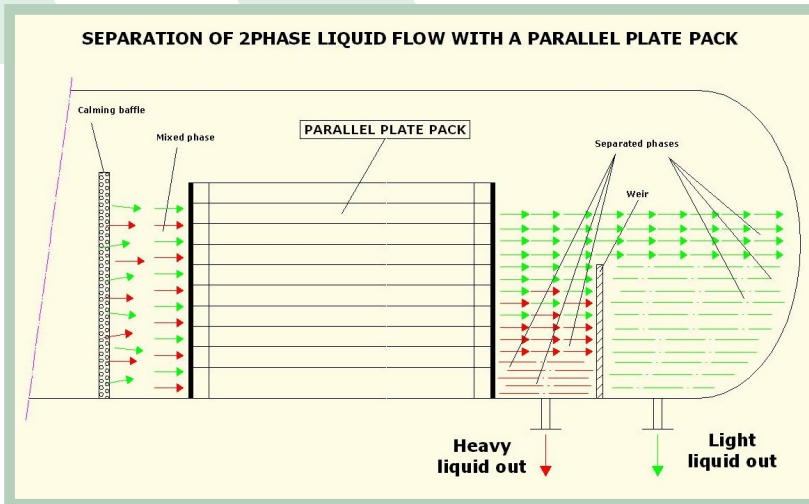
DOUBLE CALMING BAFFLE

In some particular cases, it is possible to use a Double Calming Baffle usually made by two different calming baffles in series.

This configuration significantly increases the calming effect on the flow but, on the other hand, requires more space and is more expensive.



PARALLEL PLATE PACK



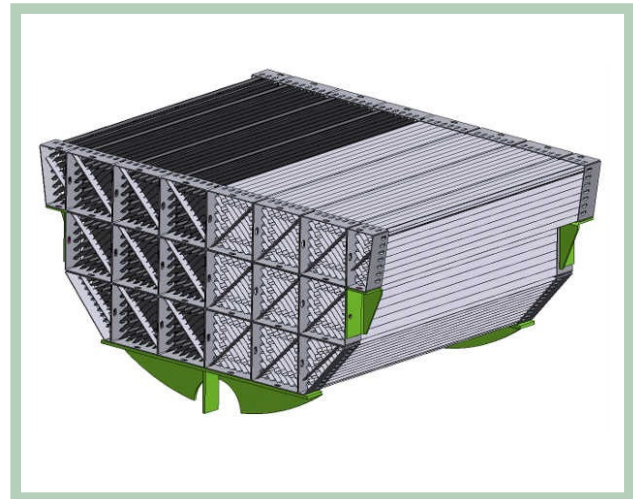
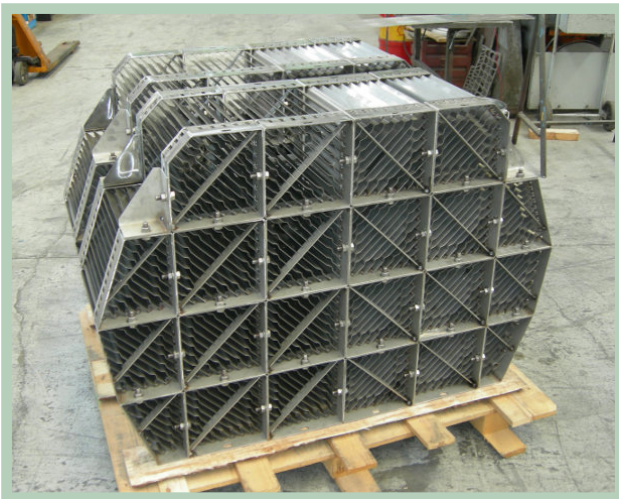
This kind of internal is commonly implemented to separate a liquid-liquid mix using the different densities of the two liquids. They are often used in many three-phase separators where the flow is composed of gaseous phase, heavy liquid phase (ex. water) and light liquid phase (ex.: oil).

The plate pack coalescer is composed of canals between long parallel plates at a fixed angle. Passing through these canals with an adequate speed, the separation of the light phase (for ex. oil) and the heavy phase (for example water) can be achieved. At the exit of the pack the light liquid is placed above the heavy phase and can be separated with a weir (see the scheme).

ADVANTAGIES

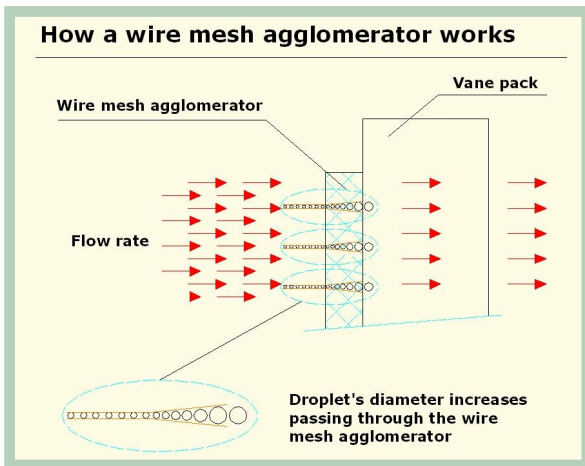
Comparing with a common gravity separator the main advantagies are:

- > Smaller separated droplets with higher efficiency of separation process.
- > Reduction of the dimensions of the vessel because this coalescer allows the same separation in a shorter space.
- > Decreasing of residence time in the vessel with a significant production increase.



HIGH PERFORMANCES VANE PACKS

1) VANE PACK WITH MESH PAD AGGLOMERATOR



Sometimes:

- > The dimension of the droplets is too small to be intercepted by the vanes (for example 4/5 microns).
- > The flow speed is too high for a normal wire mesh demister and it is not possible to retain the droplets which are torn over the mesh.
- > The required efficiency is too high for a normal vane pack.
- > The diameter of the vessel is too small to install a properly sized wire mesh demister.

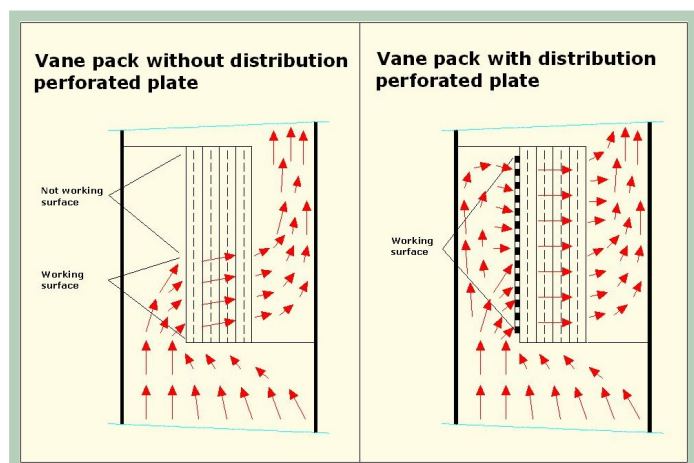
In this particular case, a properly sized wire mesh agglomerator must be applied before the window of the vane pack. As shown in the scheme below, the droplets, passing through the agglomerator, increase their dimension reaching the vane pack with the correct speed and diameter.

2) VANE PACK WITH PERFORATED DISTRIBUTION SHEET

When the diameter of the vessel is too small to allow a correct distribution of the flow, there is the risk that the gas passes through only a fraction of the available area of the vane pack window.

This bad distribution of the gas flow causes two problems:

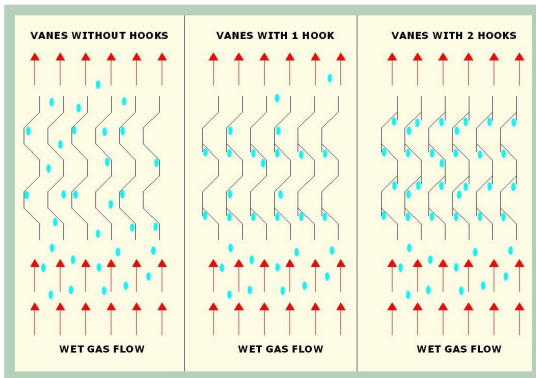
- > An excessive speed of the gas flow through the vane pack.
- > A lower efficiency of the process because many droplets can be captured by the vanes and torn over the mesh.



The problem can be solved applying a perforated distribution sheet that forces the distribution of the flow all over the available area of the vane pack window (see the scheme below).

STANDARD VANE PACK

Vane packs, with wire mesh separators, are the most widely used internals to separate liquid droplets carried by gaseous streams.



- > **Separation:** vane packs are composed of sets of vane profiles where the gas passes through and, changing direction, clashes on the vanes being captured by the hooks. Liquid droplets slide down along the vanes and are drained down by a tube into the liquid section of the vessel.
- > **Crossing speed:** in comparison with wire mesh separators, the crossing speed is usually higher allowing a reduction of the crossing area and of the vessel diameter.
- > **Performances:** however, the diameter of the smallest separated liquid droplet is bigger than in a wire mesh separator. For this reason vane packs are not recommended when a high separation performance is required.

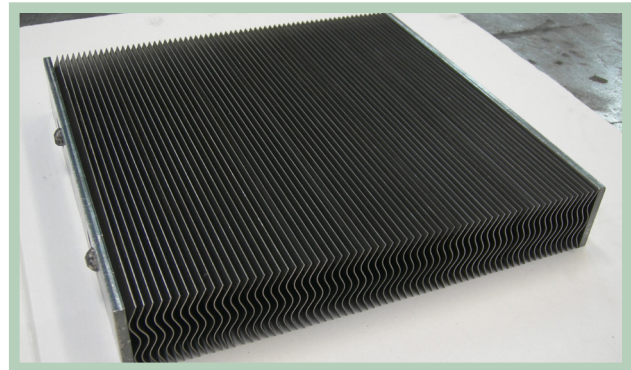
For this reason vane packs are not recommended when a high separation performance is required.

W BANK



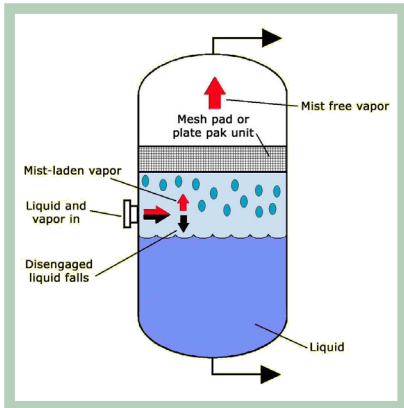
The so called “W bank” is a particular kind of vane pack used when to shorten the length of the tank is a priority. Thanks to its particular “V” shape it’s possible, with half length of the pack, to obtain an equivalent crossing area and to reduce the dimension of the vessel. The W bank maintains all the characteristics and qualities of normal vane packs and so it’s possible to assemble packs with different styles of vanes or stick on a wire mesh agglomerator to increase the separation efficiency.

DRYER FOR CYCLONE



This kind of special vane pack is often used in “steam drums” positioned over cyclones to eliminate small liquid droplets drained by vapour stream. They can be made in different shapes and profiles to get the best performance in terms of droplet separation and pressure drop.

TWO PHASE SEPARATION



GAS/LIQUID SEPARATION

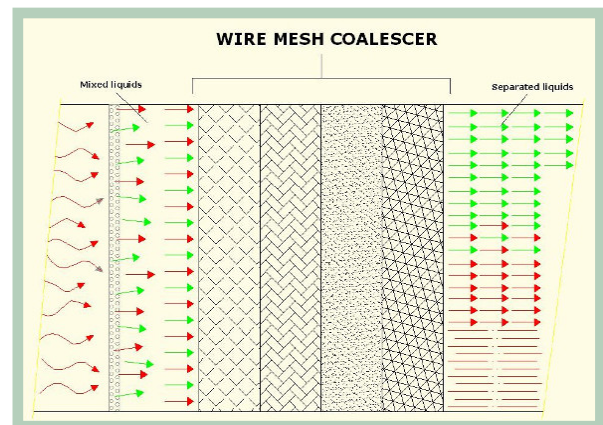
- > **Wire mesh pads:** the metallic wire mesh layers form a very dense cellular structure. Passing through it, the liquid drops are captured by the coalescent effect of the mesh. Then they are eliminated by gravity.
- > **Vane packs:** this separators are made with a variable number of vanes (with or without hooks). Vanes and hooks intercept and separate the liquids 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 3/5 times 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.

Advantagies: reduction of dimensions and costs of vessels, increasing of the purification of products, decreasing of the loosing of glycol, ammine and other expensive chemical elements.



GAS/SOLID SEPARATION

Some common application are:

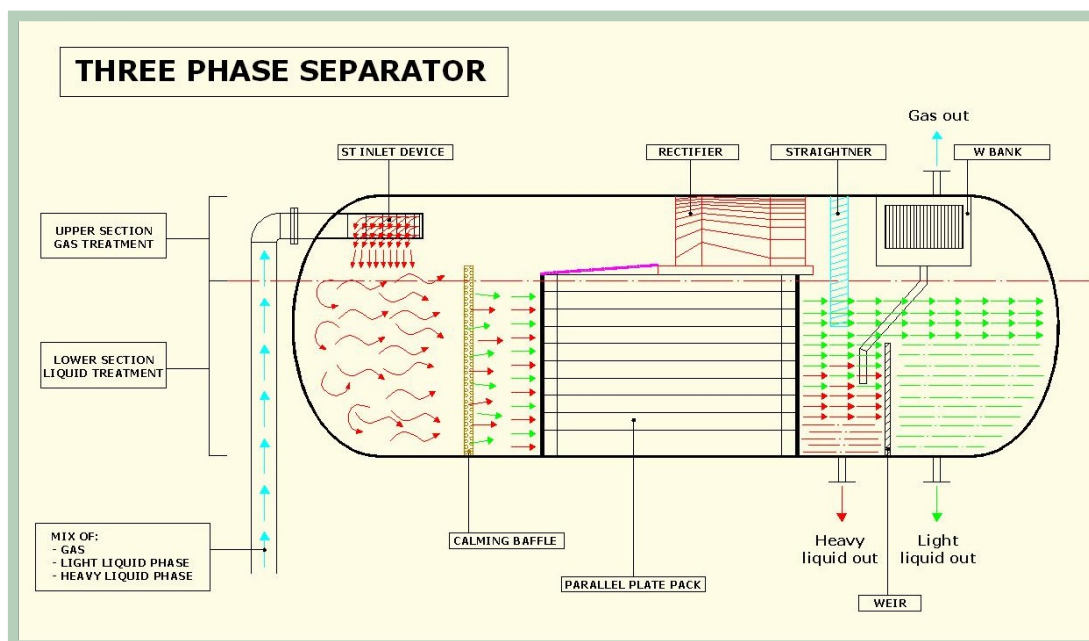
- > Desalination plants, where salt is separated from the air flow. The intercepted droplets of salt become solid inside the mesh pad and, after some time, the demister needs to be changed.
- > Air filtration and purification needed in a lot of different industrial and food process.
- > Filtration of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

THREE PHASE SEPARATION

This process consists in the treatment of a flowrate composed by three different phases:

- > 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 straightner 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.

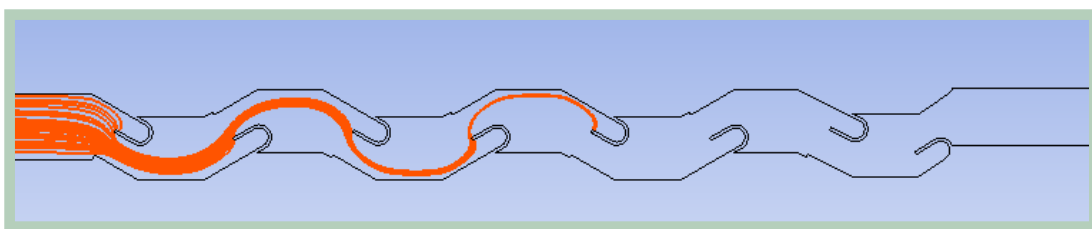
ENGINEERING

To obtain the best separation and pressure drop performances is very important a proper sizing of the separators. It's possible to choose two different ways:

- > **Checking:** the customer supplies us the process datasheet and the features of the separator. Our technical office will check the separation efficiency and the pressure drop of the flow passing through the separator.
- > **Sizing:** the customer, giving us the process datasheet, needs to define the type of separator and its dimensions to reach the requested efficiency, the right pressure drop or satisfying some dimensional limits as well.

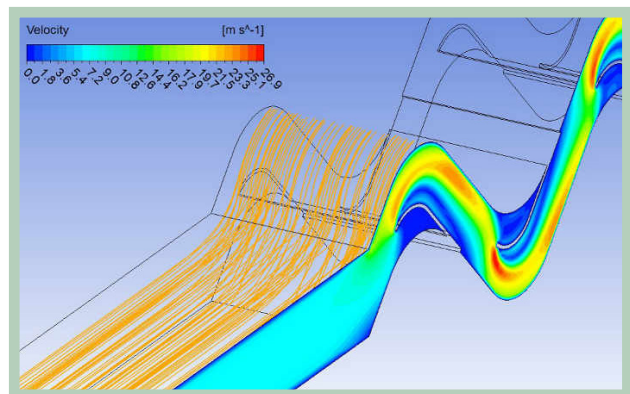
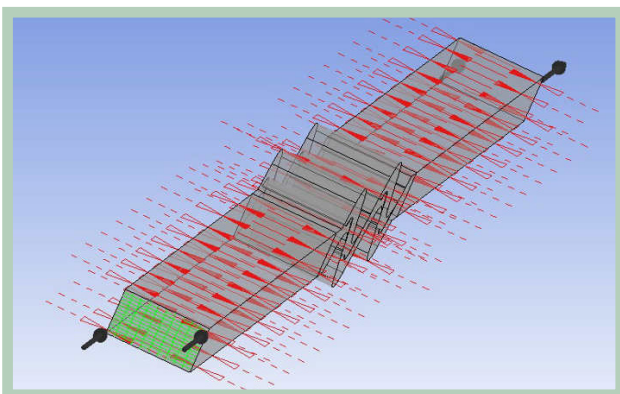
RESIZING

Sometimes happens that some parameters as vessel diameter, flow rate, droplets dimensions etc are not accorded to the process conditions and to the requested efficiency. In this case we are able to suggest the new vessel diameter or the max/min allowed flow rate through the separator or the maximum achievable performances with process conditions described in the datasheet.



DATA SHEETS

In order to make a correct sizing we need to know the working conditions (pressure, temperature, flows etc) and chemical description of gas and liquid. You can supply us these information filling the module we can send you and, on the base of these informations, we will check and size the requested separator.



SPECIAL INTERNALS

AFP Tech can provide some special internals like support grids, liquid distributors, wire mesh candles and inlet distributors generally made on the base of customer's design and drawings.



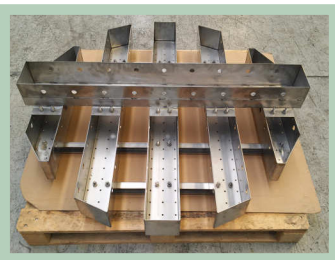
CANDLES

When it's necessary to treat a gas flowrate but, at the same time, the diameter of the vessel is not enough to guarantee a gas velocity included between the max and the min allowed velocity, the use of a candle can be the right solution. They can provide the right surface for the gas flow and, at the same time, they can work with the right gas velocity, reducing the vessel diameter as well.



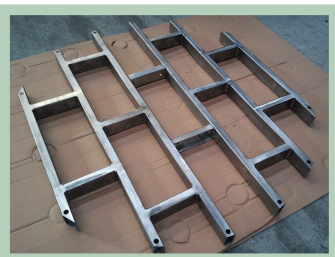
FEED DIFFUSERS

In many processes it's required a correct distribution of the gas flow inside a vessel as, for example, before some other process internals like wedge screens. In this cases it's possible to use a feed diffuser. There are many different kinds of diffuser and, on the base of customer's need, international standard and customer's design, we can draw and make some of them.



LIQUID DISTRIBUTORS

In many columns are often used structured or random packing bed to promote the process. They need to receive a liquid flow equally distributed across the cross section because a good distribution is critical to obtain the best performances from the process. The right distribution is usually provided by liquid distributors designed in function of the process needs.



SUPPORT GRIDS

Inside columns it's often necessary to install some support grids to support other internals like, for example, random packings or rings assuring the mechanical support but, at the same time, allowing the correct crossing of the grids by the gas flow without a big pressure drop. There are many different types of grates also with different lines of wire mesh applied on the grid's structure. These grids are generally made on the base of customer's design and drawings.



Design & Engineering



Wire mesh separators



Internals for columns and vessels



REFERENCES

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