The Inclined Plate Separation Process

Process

The operation of inclined plate separators is, in general, based upon the difference between the specific gravities of the oil and its carrier medium. The oily water flow is evenly distributed over a pack of inclined parallel plates. In the laminar flow in each channel (i.e. the distance between two subsequent plates) the minute oil droplets rise by virtue of the fact that their specific gravity is lower than that of the carrier medium (normally water) and they attach themselves to the underside of the upper plate. The oil film that is thus constantly being formed on the underside of each plate creeps slowly upwards along the plates. The oil film is assisted in its upward movement by the con-current laminar flow.

At the top of each plate the oil film is concentrated (coalesced) by the special fingers and leaves the plate at the ‘finger tips’ as a thick stream or a rising chain of large globules. The treated water passes through the openings between the fingers; thus there is no interference between the separated oil and the clean water.

The separated oil collects as a layer on the top of the liquid surface in the separator tank and can be removed intermittently by means of a slotted pipe skimmer. Suspended solids that may be contained in the influent will settle on the top side of the plates and will collect below the plate pack; from here they can be removed intermittently, during the process, by means of a sludge suction device.

In the case where a high content of suspended solids is expected, the lower end of the plates may also be provided with fingers to prevent the collected sludge being drawn along with the incoming fluid. Additionally, the plates can be inclined to 60° to improve the downward flow of the sludge.

The basic method of separation.
Design Parameters

The design of an inclined plate separator is based on the following main parameters:

- Type and source of liquid to be treated
- Design flow capacity
- Specific gravity of the oil
- Specific gravity of the carrier medium
- Concentration of oil and suspended solids in the influent
- Minimum, normal and maximum process temperature
- Required effluent quality.

Compact design

Due to the unique patented configuration of the internals, the SKIM separators offer the highest possible separation efficiency per given tank volume. Therefore the SKIM separators do not only require less than 1/10 of the plot size of an API design separator but are also considerably more compact than other currently available inclined plate separators.

Lower operational weights

Due to the efficient use of the volume of the SKIM separators, the water volume is kept to a minimum, resulting in lower operating weights which is extremely important, particularly in offshore production platform installations.

Simple concrete structures

SKIM separators only require a simple rectangular concrete basin and avoid complicated baffles and dividing walls.

Higher separation efficiency

The special patented coalescing fingers and co-current separation process ensure higher separation efficiencies.

Robust construction

All SKIM separators are of robust construction, based upon conventional design for long life operation: Our plate packs are contained in strong steel boxes and are designed to give many years of maintenance free operation.

Flexibility

The inclined plates are manufactured from a wide range of materials, depending on the temperature and aggressiveness of the water or to the client’s requirements. Examples are:

- Glass fiber reinforced polyester (GRP)
- Coated carbon steel
- Various qualities of stainless steel
- Teflon coated steel

Easy maintenance

Cleaning is only required once every six to twelve months and this is simply performed by water jetting. Skim separators do not require removal of any plates or plate pack during the cleaning process.

Oil and hydraulic overload

SKIM separators are able to cope with large variations in oil contaminations and flow rates without a corresponding deterioration in effluent quality.

Advantages of SKIM Inclined Plate Separators.

In waste water treatment it is difficult to find two oily waters that are exactly the same. This is the reason why SKIMOVEX do not design to standard plate packs. We are able to vary the plate length, plate spacing, plate inclination and even the number of plates per pack. Thus we are able to offer to our clients the technically optimized solution for each individual application.