

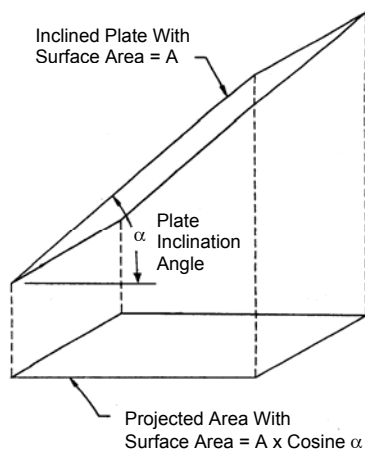
# Engineering Advisory

8255

## Product: Highland Tank Oil/Water Separator

### Product Description

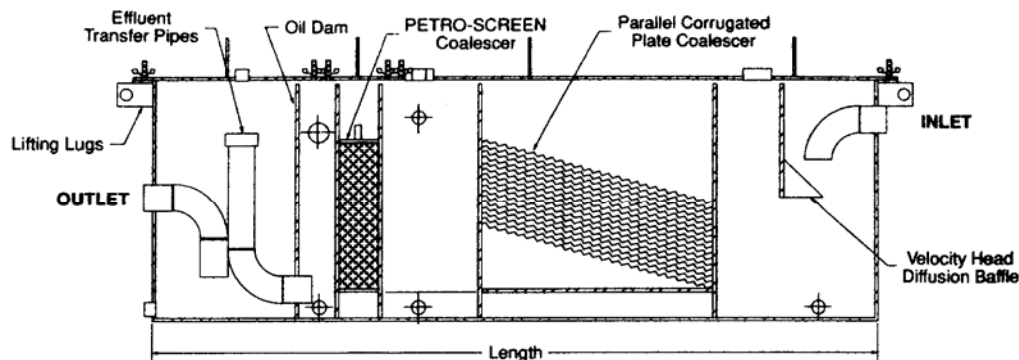
Highland Tank is a major manufacturer of steel tanks and oil/water separators. This company regularly competes on projects that specify gravity type inclined plate oil/water separators, which are sized according to the principles of Stoke's law and laminar flow. These principles require that the total of the projected plate area be determined in order to size for the treatment capacity (see Figure 1).



**Figure 1**

Some state agencies also spell out how the effective separation area is determined. As an example, pages III-7-5 and III-7-6 of the Washington State Department of Ecology Stormwater Management Manual for the Puget Sound Basin are attached. See Figure III-7.4

The Highland Tank product is shown in Figure 2.

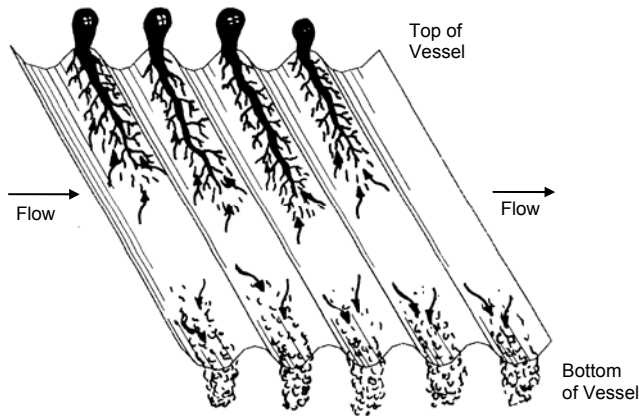


**Figure 2**

This product uses but 3-5% of the effective plate separation area required by Stoke's Law. The downstream Petro-Screen coalescer component actually removes the oil rather than the grossly insufficient inclined plates. The coalescer consists of a multiplicity of small, closely woven polypropylene filaments. Polypropylene is one of three oleophilic (oil-loving) plastics, which adsorb oil onto its surfaces. The so-called coalescer does an excellent job in removing both free oil and suspended solids. The excellent performance is short lived, however, as the coalescer rapidly plugs with solids and/or reaches its oil adsorptive capacity. For these reasons the US Air Force and the US Army Corps of Engineers both prohibit the use of oleophilic plastics in oil/water separators (references available on request). Whenever the coalescer plugs or reaches its adsorptive capacity it must be replaced.

In an effort to both justify its standard design as well as claim compliance with projected or effective plate requirements, Highland Tank fraudulently asserts that the surface area of the polypropylene filaments in the coalescer may be added to the projected surface area of the plates in order to arrive at the total effective or projected separation area. Since the coalescer achieves its effectiveness through the principle of adsorption, it is clearly improper to assert that this area can be added to the projected surface area of the plates, which achieve oil removal through the principle of gravity separation.

Even if the Highland Tank product were to be modified to include the required plate area, the orientation of the corrugations is incorrect. In a true inclined plate separator the separated particles slide up (oil) and down (solids) the plate corrugations as shown in Figure 3. Note that the plates and corrugations are both inclined.

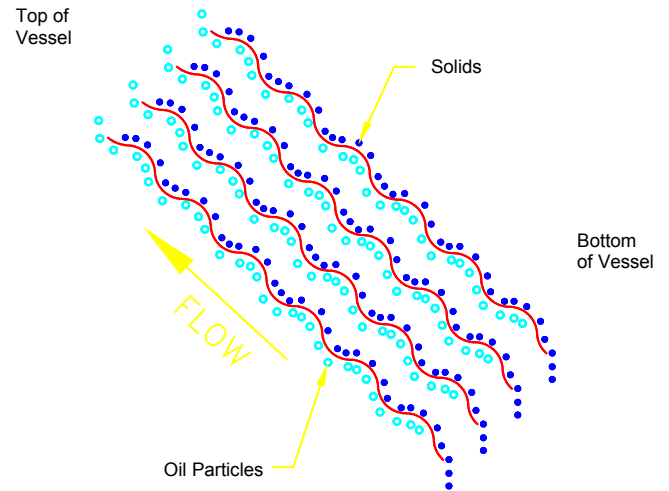


**Figure 3**

In the Highland Tank oil/water separator the plates are inclined but the corrugations are horizontal. The separated oil and solids must tumble upward (oil) and downward (solids) as shown in Figure 4.

Because the corrugations are axial to the plates, coalescence of the separated particles cannot occur to the detriment of effluent quality.

The Highland Tank design is discussed at length in WSE Publication 394 pages 15-17, attached.



**Figure 4**

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