

Coalescing Systems

Serfilco's oil water separator uses coalescing media. This media provides a suitable surface for oil droplets to meet and grow, or coalesce, into larger droplets. As oil droplets grow in size the buoyancy of the droplets increases. The droplets rise towards the surface of the water due to the fact that the specific gravity of oil is less than the specific gravity of water.

In this way the oil will form a layer that can be separated from the water by periodic draining before the water is reused or discharged. Any heavy solids present in the water being treated, or sludge, in theory should be filtered out in the prefiltration unit of the coalescing system. As oil droplets coalesce into larger droplets, the buoyancy of the droplets increases. This is reflected in the known rise time for a given size of oil droplet. The more efficient the coalescing action of the media, the larger the oil droplets become. Larger oil droplets result in reduced rise time:

Time Needed for Oil Droplet (0.85 Sp. Gr.) in Water to Rise 3 inches

Droplet Size (microns)	Rise Time
300	12 sec
150	42 sec
60	4 min 12 sec
30	17 min 24 sec
15	1 hour 8 min 54 sec
5	10 hour 2 min 9 sec

Stoke's Law

The importance of oil droplet size is obvious in the above table. This importance is also noted in Stoke's Law that defines the terminal rise velocity of a given size.

$$V = (2gr^2) (\Delta d) / 9\mu$$

g = acceleration of gravity constant

r = oil droplet radius

Δd = difference in Sp. Gr. of water and oil

μ = viscosity of water

Note: **V** increases in proportion to the square of droplet radius!