

Oily Wastewater Cleanup by Gas Flotation

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Abstract

Produced wastewater from hydrocarbon reservoirs always contains some oil. The free oil is often in an emulsified form with the median droplet diameter usually in the range 3-20 μm . Gas flotation of oily wastewater is a process in which fine gas bubbles are injected into a water phase. Oil droplets and oil-coated solids, which are suspended in the water, become attached to these bubbles, rise to the surface, are trapped in the resulting foam and removed when the foam is skimmed from the surface. The effectiveness of flotation depends on the traditional gravity separation parameters of density difference, oil droplet size, and temperature but also critical are the gas bubble size distribution and an even dispersion of the bubbles. Gas flotation is particularly valuable for removing oil droplets when oil density is close to that of water (i.e., heavy oil), such as in Trinidad. This paper discusses the operation of the gas flotation process for oily wastewater including the mechanisms behind the process, particularly the gas attachment to oil droplets. A clearer understanding of oil/bubble contact and the influence of surfactants in aiding this contact could make flotation applications more widely considered for Trinidad's oily wastewater treatment.