

ROUSSELET ROBATEL LABORATORY MIXER-SETTLERS, OPERATING PRINCIPLE

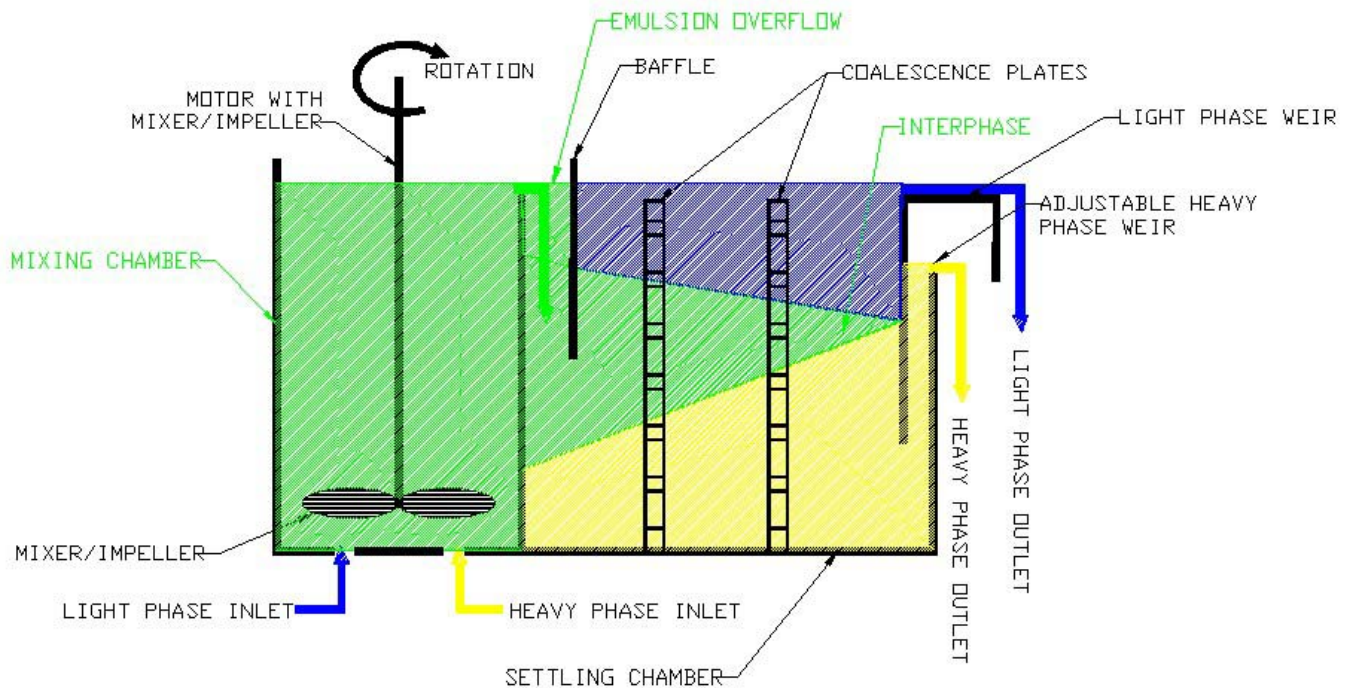


Figure 1: Cutaway diagram of a pump-mix mixer-settler stage

In each stage of the mixer-settler, a feed solution containing one or more solutes (shown in yellow), and an immiscible solvent (shown in blue) with a different density than that of the feed solution, are fed to the mixing chamber through ports located at the bottom of the mixing chamber.

A motor drives a mixing and pumping turbine. The motors are controlled by AC variable frequency drives to accommodate a wide variety of applications. The pump-mix turbine draws the two liquids from the settlers of the adjacent stages, mixes them, and transfers this emulsion (shown in green) to the associated settler. The efficient mixing creates a large interfacial area between the two liquids to ensure maximum mass transfer of the solutes.

The emulsion overflows the mixing chamber and flows into the settler. A baffle minimizes turbulence associated with the inlet flow from the mixing chamber. The two liquids are separated by gravity, and perforated grids help the coalescence of the liquid droplets. The heavier liquid (shown in yellow) occupies the bottom portion of the settler, and the light liquid (shown in blue) occupies the upper portion of the settler.



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manufacturing centrifuges and centrifugal extraction equipment

The position of the liquid / liquid interphase is regulated by adjusting the height of the heavy phase weir. The light phase overflows a fixed weir with a constant height.

The liquids are discharged by gravity to the next mixing chambers in the multistage counter-current cascade, or to downstream equipment. No interstage pumps are required between the mixer-settlers due to the pump-mix design.