

Centrifugal 3-Phase separation: How to handle critical product properties and process alterations

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Abstract:

The separation of two immiscible liquids and in many cases a suspended solid is a wide-spread task of centrifugal separation within the area of process technology based on chemical as well as biotech processes.

The particular complexity of these separations originates from both the physico-chemical properties of the liquid phases to be treated, i.e. their tendency to form emulsions, and the influencing factors based on the nature of the solid particles, in many cases causing interface problems.

In result, minor modifications within the production-processes could result in significant performance changes of any kind of separation equipment.

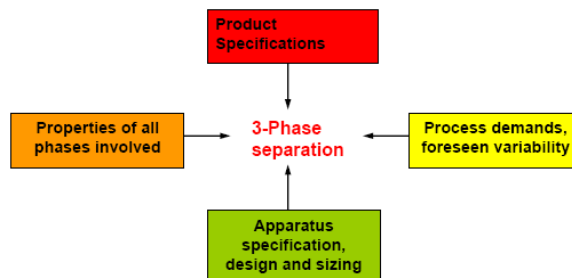
In a lot of such separation processes Disc-Stack Separators and Decanter Centrifuges are used to achieve the demanded separation.

Once specified in accordance to a given separation problem, these machines are “born” with optimum performance for exactly this system. Any alteration in the feed may lead to a sub-optimum performance in terms of separation quality and capacity.

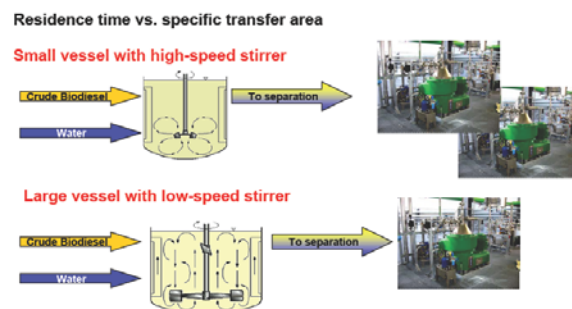
To be safe with the specification, the user should have a solid knowledge of the function and the variability of the machines applied and the factors influencing their behaviour.

Based on three different 3-Phase separation examples the paper shows:

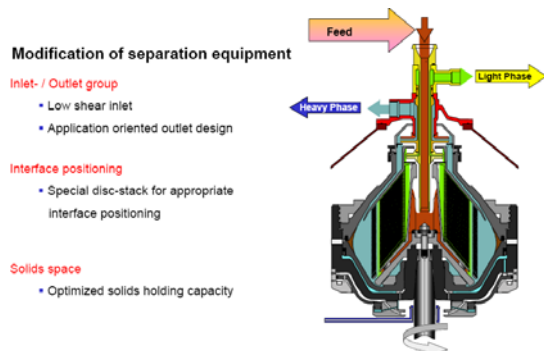
- Which data are needed to specify the separation demand and subsequently the separation equipment.



- How the process parameter in front of the separation apparatus influence the separation performance.



- The possibilities of modifying given centrifuges to adapt those to an altered or new application.



All aspects discussed are based on real separation problems and their solutions taken from chemical process technology.

The “technical solutions” shown comprise the appropriate centrifugal separation equipment including necessary auxiliaries and describes the measures to be taken to tune the process in order to achieve maximum performance of the centrifuges used.

Finally the integration of the separation apparatus in the process will be discussed using exemplary P&IDs.

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