

APPLICATION NOTE

1.02 CHEMICAL

CENTRIFUGAL SEPARATION CONTROL

- 0.01 NTU – 100% suspended solids (liquid)
- Real time continuous measurement
- Optimize centrifuge operation

Turbidity and suspended solids can be measured using a [Kemtrak TC007](#) turbidity analyser or a [Kemtrak NBP007](#) extreme suspended solids analyser.

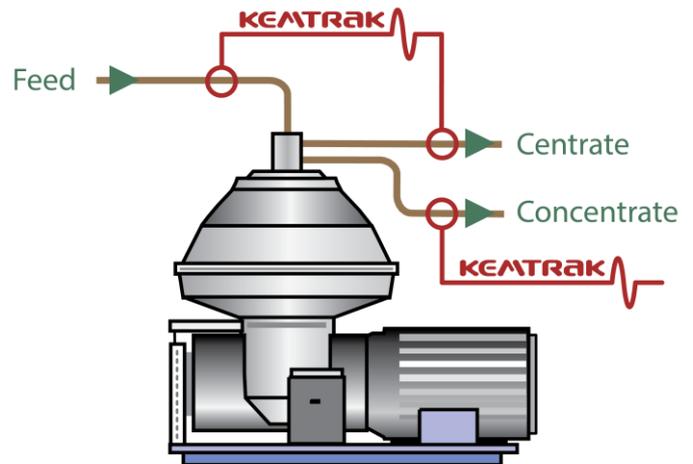
APPLICATION

A centrifuge is a piece of machinery that uses high rotational speed to separate components of different densities in mixed fluids. There are two main uses of centrifuges in industrial applications: fluid clarification and solids concentration. Centrifuges are used widely across many industries for a wide variety of applications. Examples of applications where centrifuges are used are milk separation, wastewater clarification, [olive] oil degassing and clarification, beer haze removal, solids removal from slurries in the food, oil and chemical industries.



Centrifuges greatly accelerate the natural process of gravitational settling where denser components sink to the bottom of a liquid mixture while less dense materials float on the top. Centrifuges achieve this by spinning internal bowl mechanisms at very high speed, creating forces more than 4000x normal gravity. Rapid, almost instantaneous separation is achieved within centrifuges.

When removing solids using centrifugation, solids from the influent fluid build up in the centrifuge bowl. This build up continues until the centrifuge bowl is completely full. At this point, further separation is impossible without the removal of the solids from the centrifuge. When discharging solids from the centrifuge bowl, some centrate is lost. There is also continuous centrifuges available and



then you can optimize in real time.

MEASUREMENTS TO IMPROVE EFFICIENCY AND QUALITY

Product yield, product loss, separation efficiency, and product quality can all be improved by installing in-line concentration monitors in the inlet and outlets of a centrifuge.

The feed stream of a centrifuge will often vary in content. Varying liquid mixes and/or solids concentration in the feed stream can adversely affect separation performance. By monitoring changes in feed concentration, overloads can be prevented by reducing incoming flow rate and bowl speed can be optimized

INSTALLATION

The centrate line is a common location to install a [Kemtrak NBP007](#) concentration monitor or a [Kemtrak TC007](#) turbidimeter. Monitoring the centrate for increases in solids or concentrate carryover provides input to the centrifuge control system to keep it operating at its optimum level and

protects downstream filtration and processing equipment.

Monitoring the concentrate in a liquid/liquid separator provides real-time data on separation performance and purity. Deviations in the concentrate trend are used by the separator control system to vary feed rates, initiate bowl discharge, even adjust bowl speed as needed to maintain concentrate quality.

Some control schemes mix control strategies to improve efficiency. For instance, it is quite common to operate with a timed short bowl discharge cycle to maximize in-service time and throughput while monitoring the solids concentration/turbidity of the concentrate/clarified product with a Kemtrak analyzer.

When the measured solids/turbidity within the clarified product stream gets too high, a full discharge can be automatically triggered. This strategy minimizes product loss while keeping centrifuge efficiency and clarified stream quality high.

[Kemtrak TC007](#) Turbidimeters are ideal for monitoring centrifuge performance. Compact sensors take up very little room on what is often a crowded equipment module. Fiber optic connections rather than electrical connections make for high reliability of the measurement. A wide variety of sizes and configurations are available to suit all industries and applications.

