



## ***Current Applications and Markets for Continuous Solid/Liquid Centrifuges***

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In today's world, the challenges to a process equipment manufacturer are occurring at an increasing pace. Many changes are taking place with respect to end products, materials, manufacturing and markets. Global population shifts and demographics have caused new demands on "old" products and processes. In addition to the wide variety of traditional products, the recent emphasis on reduction of fossil fuels and growth in renewables are causing many old products and processes to decline or be phased out. New products and processes have developed which require utilization of existing process equipment and technology, so historical experience is essential moving forward to make this transition.

Power generation is an example of changes in the processing industry. For decades, the primary means to generate electricity was burning coal. The mining and preparation of coal required numerous steps of classifying, washing and solid/liquid separation of the coal particles to yield material containing the least amount of impurities and retained moisture, resulting in higher Btu value end product. Changes were implemented 50 years ago to reduce the emissions from the burning of coal, which led to new equipment development that also increased the demand for calcium carbonate (limestone) for use in scrubbers. The discharge solution from the scrubbers required cleaning, which yielded another new application for solids/liquids separation equipment. In addition to the scrubbers, power plants required a large settling pond to capture the fine solids from the cooling towers, but within the last 20 years, zero liquid discharge (ZLD) power plants were designed and built. These plants have scrubbing systems that include a recirculating evaporation and crystallization system to collect and capture the fine solids and reuse the cooling water. These systems also require solids/liquid separating centrifuges in high alloy materials due to the corrosive nature of the solids/liquid mixture.

Fast forward to today, and the desire to generate renewable energy via sun and wind is again resulting in new processes or refinement in existing processes. The battery industry for vehicles is growing at a rapid pace. There are two main processes for refining lithium and both require solids/liquid centrifuges and

other separation equipment. During the processing of the lithium, multiple evaporation and crystallization steps are required, yielding a variety of by-products in addition to the lithium material, which also require separation and capture via centrifuges.

In addition to power generation, ZLD (zero liquid discharge) is growing annually to preserve and conserve one of our most valuable resources, water supply. With increased global environmental awareness, the need for sustaining, conserving and protecting our water supply has resulted in more environmental regulations and stricter rules regarding the use and disposal of water in industry. Solids/liquid centrifuges and other separating devices are used in many industrial sectors to purify or recycle process water and recover valuable materials from wastewater. The studies have shown that air cleaners can improve indoor air hygiene, but in terms of infection control they should not be considered the sole solution, as they can only lower the risk of indirect infections, but cannot prevent direct infections. They further do not exchange, but only recirculate the air and can thus not replace window airing.

The importance of the different parameters, filter efficiency and flow rate, affecting the efficacy of air cleaners will be presented along with the results of the different studies and discussed in view of the usefulness of these devices in different scenarios.