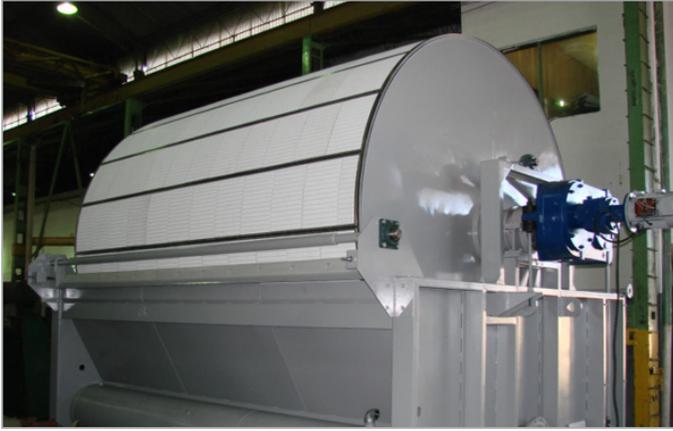


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Coal Gasification – Black Water

WESTECH
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WesTech's **Continuous Rotary Drum Filters** offer the operating flexibility to handle dewatering, washing, and filtration applications. WesTech offers a full laboratory with the ability to test water samples from any process. With precise assessment data, WesTech offers process optimization, design, and sizing of the equipment supplied. WesTech Drum Filters are available in sizes up to 13.5 feet in diameter and 36 feet in length. They are engineered for ease of operation and durability to meet the most demanding expectations.

Coal Gasification – Black Water Treatment

The roots of modern coal gasification date back to 1920s Germany where Franz Fischer pioneered the first of what would later be called the Fischer-Tropsch reactions. The Fischer-Tropsch process transforms coal into liquid fuels, including automobile fuel. Sources of feed product may vary and include coal, petroleum coke, tar sands, and biomass. Fischer-Tropsch converts the fuel to a gaseous phase at high temperature and pressure in the presence of oxygen. Hot slag (unburned material) is produced and quenched in water prior to disposal. The “black water” from this quenching process is then treated to remove residual solids and other contaminants prior to reuse.

Coarse Solids Removal

From the gasifier the hot slag passes through a lock hopper mechanism which liberates hydrogen gas while converting paraffin and naphthenes into aromatics and isomers. Quench tank slurry flows to a tank with a drag conveyor which moves the large chunks of slag. Residual water and solids then flow over vibrating screens for further solids removal. The slag from these two steps is then discarded or sold. The vibrating screen effluent is fed back to the settler prior to recirculation.

Settler with Flocculation Mechanism

The stream containing the fine solids from the settler feed tank is treated with a polymer prior to entering the settler. The settler feedwell houses the flocculation mechanism which turns at slow speed, imparting enough energy to facilitate floc formation and rapid settling. The settler tank is covered and insulated to maintain constant temperature. This minimizes temperature differentials between the

tank walls and interior which cause unwanted mixing currents that inhibit proper settling.

The rake drive for this unit is equipped with a lift mechanism. This lift raises the entire mechanism off the tank bottom if the torque increases. Typical lift is two feet in one-foot increments at preset torque limits. Should this occur, an alarm sounds and a light flashes during each lift sequence. If the increased torque persists, a final alarm is sounded and the mechanism is automatically shut down. Correction of the cause then allows an operator to restart the mechanism. The settler performs three processes in one: it flocculates, clarifies, and thickens in a combined single process step.

Rotary Drum Vacuum Filter

Underflow solids from the settler are gravity-fed to a mix tank where polymer is added. The slurry is then allowed to overflow the mix tank to a rotary vacuum drum filter. Feeding the slurry through a trough eliminates the need for pumping and the possibility of pulp plugging a feed pipe. This gentle handling of the solids allows them to be more easily dewatered on the vacuum filter. The dewatered solids are then collected for disposal.

Grey Water Oxidation Tank

Settler effluent may require oxidation to strip organics or other contaminants. If oxidation is not required, the grey water tank serves as a collection tank settler overflow. In either case, the water is recycled to a variety of steps, including quench water and syngas scrubber feed.