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Cold Rolling Wastewater

WESTECH

DWN: RCS DATE:



WesTech **Granular Activated Carbon (GAC)**

contactors are an effective means for removal of low-molecular-weight contaminants from aqueous solutions such as those generated in cold rolling mills. They are especially suited for removal of chlorine from industrial waters. When used as pretreatment equipment, these contactors will prolong the life and efficiency of demineralizing ion exchange resins and reverse osmosis membranes.

Cold Roll Mill Wastewater

Industry uses steel cold rolling to harden, reduce thickness, and provide special finishes on steel. Acidic, alkaline, and oily wastewater are discharged during cold steel rolling. Non-degradable organic pollutants are emulsified in the discharged wastewater. These contaminants are introduced by rolling, coating, annealing, pre-pickling, and alkaline cleaning of the steel. Differing steel varieties may also contribute zinc, nickel, copper, tin, and chromium as well as iron.

The waste streams are combined and aerated to oxidize sulfide to sulfate and ferrous to ferric ions. This decreases their solubility. This step can also provide some preliminary pH adjustment as the rinse stream reacts.

Aeration basin effluent is then sent to the high density sludge (HDS) reaction tank. Here it is mixed with slurry composed of fresh lime and recycled sludge. HDS systems precipitate metals in acidic streams. Recycled sludge mixes with fresh lime slurry in the HDS tank. Sludge particles are coated with lime as pH rises and flocs form. The HDS stream is fed to a Solids CONTACT CLARIFIER™. An internal sludge recycle rate of up to ten times the inlet flow rate facilitates the reaction. The combination of sludge recycling with lime addition reduces heavy metal levels down to dischargeable limits.

Solids CONTACT CLARIFIER™ effluent is pumped to pressure filters to remove any remaining suspended solids. Activated carbon or biological treatment units may be added if organics are present.

Process sludge is sent to a thickener for densification prior to dewatering. Dewatering may be accomplished using a filter press, belt press, or rotary vacuum filter. A rotary vacuum filter is depicted here. It has the advantage of semi-continuous processing, very dry cake production, and minimal chemical addition requirements.

Scale removal effluent contains suspended solids and coarse scale. Iron oxides are allowed to settle in a sedimentation basin. Oils rise to the surface and are removed with skimmers and discharged to a collecting basin. Rolling process coolant streams are also collected, treated, and recycled.

Coolant and lubricant streams emerge as emulsions. Emulsion breaking may be accomplished by thermal, chemical, or physical means such as a dissolved air flotation (DAF) or induced gas flotation (IGF). Separation of water and oily phases follows. Electrolytic chemical pre-pickling processes necessitate additional effluent treatment. This typically incorporates chromium (VI) reduction using sodium bisulfite or iron compounds. This converts the chromate to chrome (III) which is much less hazardous and easier to precipitate.