

Total removal of heavy metal from mixed plating rinse wastewater

ABSTRACT

A mixed plating rinse wastewater containing zinc, hexavalent chromium, trivalent chromium, and cyanide with total dissolved solids of 424 mg/l was treated by a model consisting of a sand filter and ion exchange columns. A strongly acidic cation resin in hydrogen form and a strongly basic anion resin in hydroxide form were used in the columns as cationic and anionic exchangers, respectively. The cationic and anionic exchangers were regenerated by using 2% H₂SO₄ and 5% NaOH, respectively. A 100% removal of zinc, total chromium, hexavalent chromium and trivalent chromium was achieved in the studies. Very high removal of total dissolved solids, cyanide and hardness level was achieved at 98.9%, 99.9% and 96.5%, respectively. The conductivity of wastewater was reduced from an average of 358 s/cm to 5 s/cm. The case study has shown that treatment systems using cationic and anionic resin were able to treat a mixed plating bath effluent to comply with the standard discharge under the Malaysian Environmental Quality (Sewage and Industrial Effluents) Regulation, 1979.

Keyword: Removal; Heavy metal; Plating; Rinse wastewater; Ion exchange