Nickel-Chromium Focus

Presentation NC4

Membrane Electrolysis as Rejuvenation Method for Hard Chrome Plating Solutions

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CH2M Hill, Inc. performed a pilot test to assess membrane electrolysis (ME) as a rejuvenation method for hard chrome plating solutions. Testing was performed under contract with CAMP, Inc. as part of the U.S. EPA Approaching Zero Discharge (AZD) program, which seeks to evaluate pollution minimization technologies for manufacturing. In addition to EPA funding, CAMP supplied pilot testing assistance and analytical expenses, with CH2M Hill providing design, testing direction and labor, and fabrication resources. Additional private sector assistance was provided by National Chromium Company, which offered its facility for the pilot test.

Two pilot tests were conducted using an ME system of CH2M Hill's design to treat hard chrome plating solution at the National Chromium Company facility in Putnam, CT. The primary performance goal of the project was to demonstrate removal of contaminant metals (primarily copper, zinc, and iron) from a hard chrome plating bath. The secondary goal was to evaluate the extent of trivalent chromium reoxidation to hexavalent chromium, or chromic acid. The first pilot test established basic operating parameters for the system, but was too short in duration to establish definitive chemical transport rates. The second test was performed for a greater duration, and established definitive results. During the 243 hours of the second test, copper, zinc, and iron each were removed from the plating solution at relatively steady rates of 0.60, 0.28, and 0.13 grams per hour, respectively. Details of the project and its economic implications will be presented.

Paper not available.

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