

ChemScan[®]

PROCESS ANALYZERS

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ChemScan[®] Application Summary #79 Electrodeless Nickel Plating

Statement of the Problem

An electrodeless nickel bath uses a chemical reducing agent to deposit nickel coatings uniformly on a receptive surface without the use of applied current. Typical systems use hypophosphites, aminoboranes or borohydrides as reducing agents. The plating reaction depletes the bath of nickel, reducing agent and stabilizing ingredients and also forms H⁺ that lowers the bath pH. In order to keep the bath components within the appropriate ranges, replenishing concentrates are added based on an analysis of bath concentration.

Control Strategy

The consumption of critical components in the bath occurs in direct proportion to the consumption of nickel. Typically, two proprietary concentrates containing nickel, reducer and trace ingredients are added in equal volumes. Alkaline ingredients (ammonium hydroxide or potassium carbonate) may need to be separately added or may be formulated to automatically adjust pH as a function of the concentrate addition.

Apparatus

ChemScan Process Analyzers can detect nickel directly in an undiluted side stream recirculated from the plating bath using spectrophotometric (light absorbance) techniques and a temperature measurement. Nickel concentration is calculated by the ChemScan Analyzer and is output in the form of a 4-20 mA signal, which can be used as an input value for control of replenishment concentrate feed pumps.