

Degradation of Power Contacts in Industrial Atmosphere: Plating Alternative for Silver and Tin

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Abstract--- Traditional Silver and Tin plating exposed to specific corrosive gases form heavy nonconductive scale of sulfides and oxides of said metals leading to overheating and multiple failures of circuit breaking equipment. Well-recognized anticorrosive properties of Electroless Ni (EN) are widely used to protect various metals from corrosion, but it is rarely used for plating of electrical parts due to relatively high electrical resistance of plating layer of non-crystalline nature. We found that EN plating with predetermined content and thickness provides reliable and long lasting protection from corrosion in hot and humid atmosphere with high concentration of Hydrogen Sulfide, specific gaseous environment of chemical plants, paper and steel mills, wastewater and sewage treatment plants, etc. Added to in-lab testing of corrosion and electrical properties of EN plating we conducted a yearlong testing in industrial environment of wastewater treatment plant. This test showed that Electroless Ni could effectively substitute traditional Ag and Sn plating and protect copper current carrying parts of circuit breaking equipment from damaging corrosion for substantial period of time up to one year without significant discoloration. We demonstrated through the series of life tests that re-plated equipment could be applied at the same ratings as originally designed by manufacturer.