TATA MOTORS

HCI FREE PICKLING - ADVANCING TATA'S CSR TRADITION

PILOTED TECHNOLOGIES

Tata Motors' new electroplating and pickling innovation is a non-hazardous, fumes free, operator friendly and more economical alternative to conventional hydrochloric acid.

THE CONTEXT

The current electroplating industry horizon is 80 electroplaters for Tata Motors and around 6,000 units across India encompassing the organised and unorganised sectors (source: Metal Finishing Association of India). The combined exposure to hazardous hydrochloric acid (HCl) in these electroplating shops works out to around 280 million man-hours per year, nationally.

The proposed innovation by Tata Motors aims to address the damaging effects of HCl on the environment, human health and vehicle reliability. This alternative solution can protect the structure of electroplating shops from damage due to rust, which roughly amounts to Rs 13,000/month/electroplater.

THE INNOVATION

Tata Motors has developed a chemical alternative to HCl for use in the pickling/descaling process, without compromising on any of the processing parameters and quality characteristics. This compound was developed through a combination of chemical agents that match the performance of HCl, while eliminating its harmful effects. The TRIZ method was used to address this physical contradiction to arrive at the chemical compound, Surfa DR3 T, where the 'T' symbolises Tata Motors. An industry first, this solution is currently in the patent application stage.

KEY CHALLENGES

MATCHING THE PERFORMANCE OF HYDROCHLORIC ACID

As a strong acid, HCl exhibits fast and excellent pickling and descaling characteristics. The new chemical compound was tailored to match HCl in performance. Salt Spray testing was done to evaluate its corrosion performance on the plated parts and Weight Difference testing measured its pickling efficiency.

ADDRESSING THE COST ECONOMICS

As HCl is available in abundance, it is an economical option. The cost economics of the proposed chemical compound and HCl were evaluated by comparing the respective operating costs, disposition costs, raw material costs, etc. The new solution turned out to be more economical in terms of the total cost structure, at approximately Rs 3,000/month/electroplater. This cost difference is expected to be enhanced through economies of scale, after deployment across Tata Motors' pan-India operations.

POTENTIAL IMPACT

The development of this new chemical compound promises to be a gamechanger for the electroplating and pickling industries, worldwide. With the elimination of health hazards associated with HCl fumes, workplace safety will improve significantly. This could potentially impact 450-505 million cubic feet of workspace across Indian automotive electroplating workshops. The new solution can bring down costs relating to the preservation, maintenance and replacement of shopfloor structures by

₹36,000-50,000 / ELECTROPLATER / YEAR

TATA INNOVISTA