

RECP Best Practices Catalogue

Installation of an ionic retarder for the acid bath

Developed within the framework of MED TEST II



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



The SwitchMed Programme is
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Best Practice - Installation of an ionic retarder for the acid bath

SECTOR:	Metal, electrical and motor vehicle parts
Branch:	Manufacture of other fabricated metal products
CATEGORY	Process control or modification
APPLICABILITY	Process

COMPANY SIZE	200
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Description of the Problem (Base Scenario):

The stripping operation consists in removing the iron oxides from the steel strands using a hot sulphuric acid solution. With use, the amount of iron increases in the acid bath, which causes a loss of the level of acidity needed for stripping. This requires rejuvenation of the acid bath and consequently generates many waste acid discharges and a high consumption of acid.

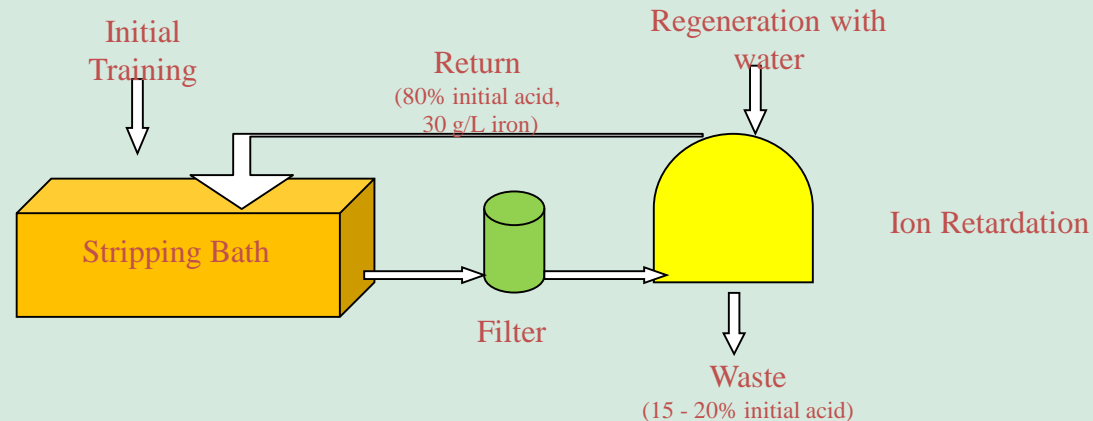


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Description of the Solution

An ionic retarder at the stripping bath ensures continuous filtration without downtimes or regeneration of the bath. Indeed, the acid retardation makes it possible to separate the free acidity of the metal salts in solution by the use of ion exchange resins in an intermittent operation. The acid retardation method is based on the fact that in a highly concentrated salt/acid mixture, the acidic anions are able to penetrate the resins of an anionic exchanger, while the metal cations are removed by electrostatic repulsion. This method saves up to 80% acid and reduces water consumption, releases and sludge.



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Economic Gains

€ 36,400:

- Savings on acid: $2.5 \text{ m}^3 \text{ acid/week} \times 80/100 \times 1.84 \text{ kg/L} = 3,680 \text{ kg/week}$ Cost of 3,680 kg $\text{€ } 0.110/\text{kg} = \text{€ } 405/\text{week}$ (estimated at $\text{€ } 20,000/\text{year}$ (48 weeks)).
- Estimated savings for waste management: 7 m^3 (9 m^3 bath volume minus 2 m^3 in discharge delay/week $\times \text{€ } 49/\text{m}^3 = \text{€ } 343/\text{week}$ ($\text{€ } 16,400/\text{year}$)).

Environmental Gains

- Saving of 176.64 tons of sulphuric acid, which is 60% of overall consumption
- Savings of 3 000 m^3 of water, or 4.5% of overall consumption
- Reduction of 80 tons of stripping sludge, or 80%

Health and Safety Impact

Improvement of work conditions



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Capital Investments & Financial Indicators € 75,000
Time for Return on Investment: 2 years

Suppliers Information
Imported

Other Aspects Improvement of productivity and quality

Implementation Carried out



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