

ALTERNATIVES TO PHOSPHATING

Sustainability and quality in perfect harmony

The more stringent environmental legislation as well as the ever more varied metal combinations in applications are giving traditional phosphating processes a hard time. There are, however, sophisticated alternatives, which in terms of quality are not inferior to phosphating and offer clear advantages in terms of efficiency.

— The phosphating process has proven to be successful in millions of cases. Worldwide it is regarded as a reliable metal pretreatment prior to painting as it provides excellent corrosion protection and ensures very good adhesion. For a

long time, the drawbacks of this technology were of minor importance. However, as a result of a heightened sensitivity for environmental issues, permanently rising energy prices, increasing use of metal-mix as well as continuous process optimisation, these drawbacks are now becoming considerably more relevant. This has led to an intensified search for alternatives.

Stable and robust chemistry

In the automotive, coil coating and household appliance industries as well as in the construction and agricultural machine sector, the environmentally-sound technologies Oxsilan, Gardobond EPP and AP from Chemetall have already proven their worth. The basis of the new pre-treatment processes are silanes and phosphonates in combination with zirconium or titanium compounds.

Environment benefits from milder solutions

Due to the eutrophication of rivers and lakes only phosphate-free processes are allowed in many countries. While conventional methods produce phosphate sludge, the new technologies hardly corrode the metal surfaces and thus reduce the sludge formation to a maximum of 0.2 g / m² material throughput. Incrustation in the pretreatment tunnel as well as clogged pipes and spray nozzles, which then need chemical or mechanical cleaning, are now a thing of the past. In combination with the right cleaners, the pretreatment processes produce excellent results, despite the relatively 'mild' conditions in the conversion baths.

No toxic heavy metal

The new technologies offer advantages with regard to workplace hygiene and simple storage. They are free from toxic heavy metals such as nickel, and are rated simply as 'corrosive' according to GHS. Due to their non-hazardous substances, waste-water treatment is simple and economical – a conventional lime milk precipitation is normally sufficient to remove all active components from the process waste-water.

Economical and flexible

A job coater's daily work is shaped by an increasing variety of materials, which poses an ever-growing challenge for phosphating processes. The new multi-metal processes are capable of pre-treating all common metals such as steel, stainless steel, aluminium or magnesium alloys and cast steel. There are also

| Chromium-VI | Chromium-III | Trication-ZnPh | Iron phosphating | Gardobond AP Gardobond EPP Oxsilan |
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GHS hazard pictogram (Globally Harmonized System of Classification, Labelling and Packaging of Chemicals)

advantages in terms of energy and water consumption. Chemetall's Oxsilan, Gardobond EPP and AP processes work at room temperature and therefore do not need expensive bath heating. At the same time, water costs can be reduced by up to 70 % using an ,intelligent' rinse water process. Reduced water consumption also has a positive effect on the costs of waste-water treatment.

Considerable process costs savings

These advantages have convinced many companies in the last few years to explore new avenues in pre-treatment. Adam Opel GmbH in Kaiserslautern, for example, has chosen to do this. The components manufactured there, including front and rear axles for the Opel Insignia, have been successfully converted from a zinc-phosphating process to the Oxsilan technology. "Our expectations have been exceeded," says Michael Schmitt, Opel Area Manager at the Kaiserslautern plant. "With the implementation of the Oxsilan technology we could significantly reduce our overall process costs and improve our competitiveness while retaining the same high quality of our components."

Polaris Industries has also changed their pretreatment of snowmobiles from an iron-phosphating process to the Gardobond EPP technology and achieved significant process cost savings due to the reduction of energy (-80 %) and water (-35 %) consumption as well as a simplified water treatment. Al Derosier, Production Manager at Polaris Industries, confirms: "During the changeover to Gardobond EPP our pretreatment costs per unit were cut by almost half. We were also able to retain our high quality standards and remain committed to our eco-friendly company policies."

Since the beginning of 2005, Chemetall has successfully converted many plants to the new, environmentally-

sound technologies. While being comparable to the phosphating process in terms of quality, they can considerably reduce the overall process costs. And the sometimes drastically lower costs for energy and disposal are likely to gain in significance over the coming years. After all, even optimists do not expect prices for energy and environmental protection to drop.

| | Zinc phosphating | Oxsilan |
|--|------------------|---------|
| Energy consumption (Ø 0.06 Euro per kWh) | € 3.40 | € 2.10 |
| Water consumption (Ø 0.15 Cent per litre (mixed water)) | € 0.35 | € 0.15 |

Energy and water consumption per 100 m² material throughput. The data shows average values on the basis of several case studies with 6 cent per kWh and 15 cent per litre of mixed water.

Contact:

Werner Rentsch, Chemetall GmbH,
Frankfurt am Main, Germany, Tel. +49 69 7165-2233,
werner.rentsch@chemetall.com, www.chemetall.com

CHEMAL

Process Chemicals for Perfect Surfaces

CHEMAL GmbH & CO. KG
Heinrich-Welken-Str. 8 · 59069 Hamm
Tel. + 49.2385.910 100 · Fax + 49.2385.6293
www.chemal.com · E-Mail: chemal@chemal.com

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