SAXONIA GALVANIK

Current status on the authorisation and substitution of chromium trioxide at SAXONIA Galvanik

Authorisation Process

Since September 2017, companies that handle hexavalent chromium compounds in their production must have applied for an authorisation for the corresponding use.
But even with this authorisation, the days of chromium(VI)-containing substances in industry are numbered. In perspective, these compounds must be replaced by alternatives. Therefore, with the availability of suitable alternatives, a conversion of the current chromium(VI) processes is imperative. In the specific case of plastic chrome plating, this applies not only to chrome plating, i.e. the deposition of the metallic chromium end layer. It also applies to the processes for pretreating ABS, ABS/PC and polyamide. In addition to the full-surface coating, these processes for plastic pre-treatment must also perform the selective coating of ABS and ABS/PC.

To safeguard our interests and to be fully capable of delivering at all times, SAXONIA Galvanik has been involved in applications for approval for the continued use of chromium trioxide since 2015. Since 2017, the applications for approval have been positively assessed by the European Chemicals Agency (ECHA) with recommended review periods of 12 and 4 years:

(1) Plating on plastics for automotive applications ("FGK application", right holders: Gerhardi Kunststofftechnik GmbH, SAXONIA Galvanik GmbH et al. and other FGK members).
The authorisation for further use of chromium trioxide refers to all products, which we manufacture for our customers in the automotive sector.

(2) Functional chrome plating with decorative character (authorization holder: Chemservice GmbH, previously: LANXESS Deutschland GmbH et al.)
The authorisation includes SAXONIA Galvanik as a downstream user and all products manufactured by us.

Unfortunately, the final decision by the EU Commission has been delayed and is still pending. Most recently, additional substitution plans were requested. Separate substitution plans were developed for the two process steps pre-treatment and chromium deposition and submitted in 2020. A first assessment of the substitution plans by ECHA took place. The FGK application was classified as "credible" and comprehensible. According to the now known timeline, a final decision by the EU Commission as legislator is expected for the end of 2022.

Substitution and implementation of alternatives in series plants and for series projects

At the same time, SAXONIA Galvanik has used the time created to push ahead with the substitution of chromium(VI). In addition to the development of the alternative processes now available, the integration into the in-house series production facilities and the involvement of the entire supply chain in ongoing projects is a major challenge.

The possibility of **chromium plating using trivalent electrolytes** is almost already state of the art and thus a suitable alternative to chromium(VI), which REACH makes a chemical subject to authorisation. More and more car manufacturers, but also customers outside the automotive industry, are starting their articles plated with it. No wonder, since these surfaces are now equivalent to conventionally produced parts in terms of appearance and quality standards and can no longer be distinguished from them with the naked eye.

This makes it possible to mix conventional and chromium(VI)-free plated components in an assembly or vehicle. Currently, these processes have already been implemented in 3 out of 4 series production plants.

The **replacement or elimination of chromium(VI) in the pre-treatment**, however, has proved more difficult. Almost every process supplier has now developed a process. However, most of the alternatives have not yet been tested over a long period of time, are difficult to integrate into existing plants or cannot cover the entire spectrum of components, such as multi-component parts or parts masked with stop varnish.

These are all problems that were also encountered when integrating the new technology at SAXONIA Galvanik with its wide range of products. After installation and testing of the selected process in 2020 and production of several hundred thousand 1K parts from the non-automotive sector, sampling of sophisticated automotive parts was started in 2021, including multi-component parts. For the latter, excellent selectivity of the chrome coating to the non-coated plastic was evident from the outset. The OEM-specific tests were successfully passed after the usual adjustment loops, which led to the first **OEM approvals for these 2-K automotive parts**. In the meantime, well over 50,000 parts have been mass-produced in very good quality.

As more and more experience was gained with the new process, it became apparent that, in addition to classic ABS and ABS/PC blends, other plastics such as various PP types and MBS can also be adhesively coated. This gives the customer further options in the choice of materials. Another alternative process is available for polyamide.

However, the potential of the new pre-treatment to plate other plastics was not all good. The masking of raw parts that had been practiced for decades, for example to keep snap-in hooks or welding points free of metal, could no longer be reproduced. The applied stop lacquering was also metallized here, as was the third plastic component added in recent years, a special TPE, which survives the process undamaged and provides a special feel.

To solve this problem, intensive work was done with suppliers to find a solution. The process was further optimized through various adjustments, so that after successful sampling, **OEM approvals for parts with masked areas and multi-component parts with TPE** are now also available and these can be produced in series. It is particularly pleasing that, in addition to new projects, ranges in series production in the automotive sector could be converted to the new process for the first time.

This means that SAXONIA Galvanik GmbH can now plate the entire range of parts, from 1-K parts to complex multi-component parts with TPE or masked areas. Especially in view of risks due to short approval times for important chromium trioxide authorisation applications, this creates options for additional delivery and supply security, not only in the automotive supply industry.

In the meantime, coatings can be applied 100% chromium (VI)-free on 2 large series production lines. The conversion of further lines as well as the complete changeover of production to chromium (VI)-free processes will strongly depend on how quickly the approvals in the supply chains are obtained. In order to safely meet the current legal deadlines of 2024, these processes must be focused and accelerated. Here we hope for support from the supply chain up to the active participation of the OEMs. Despite positive test results and high qualities, projects may not be converted without approval along the supply chain. Unfortunately, these changeover processes are still very slow. The start-up of new projects is already planned for the new processes.

Since the start of production of the new processes, more than 7 million single- and multi-component parts made of ABS or PC/ABS and more than four million polyamide parts have been plated under series conditions with very good quality and completely free of chromium(VI). The common tests for adhesion according to OEM standards have been passed - both in internal tests and in laboratory tests by involved OEMs.

Halsbrücke, July 2022