

Barrel Plating of Chrome - is that possible?



Figure 1: Samples coated in the pilot tank using SAPHIR 2050.

Chrome coatings play an important role in both decorative and functional electroplating. In some areas of decorative plating, trivalent chromium plating has already been successfully implemented despite the more demanding process control compared to hexavalent electrolytes. In contrast to hexavalent electrolytes, one advantage besides the lower health hazard is that the coating process can be continued even after a short power interruption. We have taken advantage of this property in the development of our new electrolyte SAPHIR 2050.

SAPHIR 2050 is an innovative barrel process for the deposition of chromium. It eliminates the time-consuming and tedious process of attaching small parts, so that chrome plating can be carried out directly after the barrel nickel. A visually appealing, bright chrome layer is deposited (see figure 1).

The advertisement features a woman with blonde hair, smiling and holding a magnifying glass over the word 'CHROM-'. The background is a soft-focus laboratory or industrial setting. The text 'NACHHALTIGES' is positioned above 'CHROM-', and 'VERFAHREN' is below it. In the bottom left, it says 'Hier stimmt die Chemie. Schöne Oberflächen.' In the bottom right, the website 'www.kiesow.org' is listed. The Kiesow logo and product name 'SAPHIR® 2000 BL' are in the top right, with the tagline 'Prozesssicher, ohne Komplexbildner' below it.

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Figure 2: Coated samples at the customer (20 A, 30 min., 52 °C). A coating thickness of 0.18 - 0.29 µm could be measured.

| | Limit values | Optimum |
|-----------------------|-----------------------------|---------|
| SAPHIR 2000 Donator | 65 – 75 ml/l | 70 ml/l |
| SAPHIR 2000 Conductor | 270 – 300 g/l | 280 g/l |
| SAPHIR 2000 Improver | 40 – 50 ml/l | 45 ml/l |
| SAPHIR Additiv 950 | 10 – 15 ml/l | 13 ml/l |
| Temperature | 50 – 55 °C | 52 °C |
| pH-value | 3,2 – 3,6 | 3,4 |
| Exposure time | 30 – 60 min. or as required | |
| Density | | 23 °Be |

Table 1: Working parameters for the SAPHIR 2050.



Figure 3: Tank for barrel tests directly at the plant. The tub is equipped with a pump, heating and ion exchange column.

The process can be controlled very well with various additives, which can mainly be dosed in liquid form. The most important additives and working parameters are listed in table 1. The SAPHIR 2050 was successfully tested in the pilot plant and at the customer's site. Coating thicknesses of 0.1 - 0.3 µm chrome are achieved in 30 minutes. Due to the very good throwing power, small parts can be completely coated in the drum, as shown in figure 2. In order to test the SAPHIR 2050 in practice, a transportable test tank was built to enable the process to be put through its paces directly at the plant (figure 3). The cobalt-free SAPHIR 2050 electrolyte works in a wide working range and the additives can be easily analysed. The electrolyte as well as the rinsing water can be disposed of internally according to a specially developed regulation. The method opens up the possibility of simplifying workflows and speeding up processes.