

Surfactants and dynamic surface tension in chrome-plating processes

Product: SITA DynoTester+, SITA pro line t15+
Industry: Electroplating
Measuring principle: Measuring the dynamic surface tension

In functional and decorative chrome-plating processes as well as in plastic pickling processes, it is preferred to use resistant surfactants as wetting agents in order to reduce the surface tension of the electrolyte liquid.



Figure 1: Surfactants are essential for a consistent and non-porous surface.

To prevent adhering hydrogen bubbles as well as the development of pores in the layer, a complete wetting of the treated surface is necessary. Due to the low surface tension, small gas bubbles develop in chrome-plating processes. Those gas bubbles result in a stable foam cover on the electrolyte liquid and minimise the development of toxic spray mist. At the same time, the foam cover interferes with the electroplating system and the extraction.

● PFOS surfactants are replaced

PFOS surfactants are extraordinary resistant and thus, were used and established in chrome-plating processes for a long time. Following the REACH regulation, they were strongly regulated and subsequently replaced by newly developed part-fluorinated and flour-free surfactants. Those partially foam-free alternatives reduce the surface tension in the same way and reach an acceptable lifetime.

● Bubble pressure tensiometry

To identify surfactant over-dosage as well as under-dosage, it is recommended to use bubble pressure tensiometry for determining the surface tension. The surface tension of the electrolyte solution in mN/m is directly dependent on the surfactant concentration. A dynamic surface tension additionally measures time- and

speed-dependant values offering conclusions about the wetting behaviour.

Mobile SITA process tensiometers such as the SITA DynoTester+ measure the surface tension of electrolyte samples in the laboratory or directly at the plant. The concentration can be determined by the value of the surface tension via reference curves programmed into the device.



Figure 2: SITA DynoTester+



Figure 3: A small air bubble at the capillary tip is used as interface for measuring the dynamic surface tension.