

The dynamic surface tension in water-based paints and varnishes

Product: SITA DynoTester+, SITA pro line t15+, SITA pro line t100
Industry: Paints & varnishes
Measuring principle: Measurement of the dynamic surface tension

Water-based paints and varnishes contain surfactants as additives to lower the surface tension. It is through surfactants that the use of water as a solvent becomes possible since pure water would be unsuitable due to its high surface tension and would bead up during surface application.

There are essentially two main tasks to be solved when applying paint:

● Promote wetting

Optimum wetting (spreading) takes place when the surface tension of the liquid ink at the time of contact is lower than the surface energy of the substrate. Since paint application, such as spraying, is a time-critical wetting process, the choice of surfactant and, in particular, the dynamics of the surfactant are of great importance. The type and concentration of the selected surfactant essentially determines the dynamics of the wetting behaviour (see illustration).



Figure 1: SITA pro line t15+ for measuring dynamic surface tension

● Avoiding surface defects

To improve the appearance of the paint film, avoid surface defects and prevent flow disturbances, the surface tension of the paint is reduced with flow additives.

A number of possible flow disturbances and surface defects during drying, e.g. floating, pinholes or craters, can also be contained via the surface tension of the ink.

● Device application

SITA tensiometers offer many possibilities in product development and formulation optimisation to analyse and adjust the surface tension of the ink both in the highly dynamic range (wetting during spraying) and in the quasi-static range (beginning of drying). Temperature-dependent effects can also be analysed very easily.

In addition, SITA tensiometers are used for the rapid quality control in production and incoming goods in order to monitor the quality criterion of surface tension.

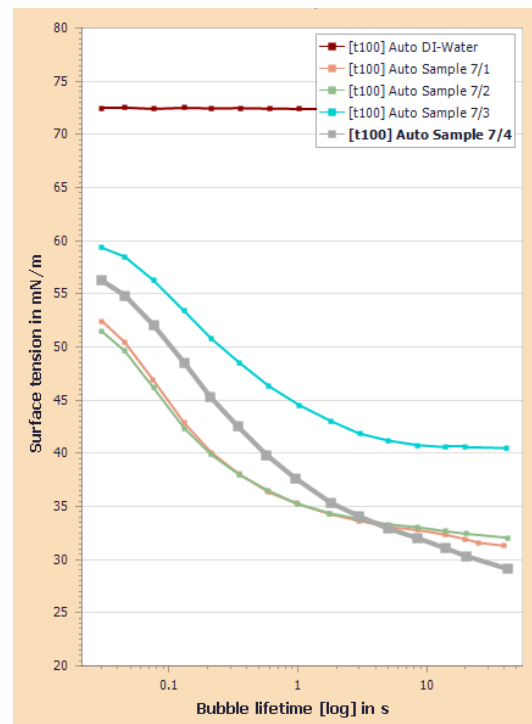


Figure 1: Comparison of four water-based dip coatings, influence of different additives.