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## THE USE OF WETTING AGENTS

ACAT distributes a range of wetting agents from our supplier Münzing Chemie. In this article I would like to present some aspects for the use of these products and the possibilities of product selection.

First I want to outline some surface defects and flow problems. The reasons for the different flow problems can be:

### REASONS FOR FLOW PROBLEMS

- volume reduction during drying
- evaporation of the solvent
- weight or thickness of film
- rheology or viscosity influence
- type of application
- drying time and open time
- bad defoaming
- impurities
- too high surface tension of the liquid coatin
- varying or different surface tension in the wet film



The bubble pressure method is one of the several methods for measuring the surface tension

Some of these problems can be solved with wetting agents, others not:

Therefore it is essential to accurately study the surface defects and to determine their causes. Only disruptions that are caused by changes of surface tension can be solved with wetting and levelling agents.

### SOLUBLE ARE:

### INSOLUBLE:

- craters
- fish eyes
- orange skin
- blistering

- tearing
- sagging
- pinholes
- roller / brush marks

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The Ring Method is another method of measuring the surface tension

#### WETTING OF THE SUBSTRATE:

- The lower the contact angle, the better is the wetting of the substrate.
- The contact angle is influenced by the surface tension (s), the liquid and the surface energy (s) of the substrate.
- Liquids spread on substrates when the surface tension is lower than the surface energy of the substrate.



Wetting of the substrate / contact angle

From this, it follows that the surface tension of the coating is the most important criterion for a good wetting. Surface tension has to be lower than the surface energy of the substrate. In water-based systems wetting agents are necessary to reduce surface tension.

For the measurement of the surface tension a number of methods are available. One of these methods is the Ring Method by Du Noüy. It is a classic method for the measurement of static surface tension. Here, a platinum ring is placed on the surface of a liquid and then withdrawn slowly. Between liquid and surface a lamella is formed. The maximum force at which the lamella breaks is determined and used to calculate the surface tension.

Another measurement method is the so-called bubble pressure method. This is the most common method for determining the dynamic surface tension. Thereby, air is pumped through a tube into a liquid. The rising bubbles produce counter pressure DP at the exit of the tube. This pressure is related to the surface tension of the liquid. Using the Young- Laplace equation the dynamic surface tension sd can be calculated taking the bubble radius r into account.



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For selecting the right wetting agent some additional parameters have to be considered. In addition to the measurement of the surface tension parameters such as the behaviour of defoaming, visual assessment and some others play a significant role.

#### IN SUMMARY IT SHOULD BE NOTED:

- Not only the surface tension, but also the polarity of the coating is influenced
- Laboratory tests are necessary to assess and to prevent negative impacts
- All surface-active substances influence each other
- In combination with defoamers wetting agents can be ideal partners

Therefore, we are pleased to offer our customers a trial in the laboratory of our supplier Münzing. Our field staff will be happy to advise you on the optimal use of our products.

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