In recent years, Applied Chemicals has gained comprehensive expertise in the application of fixing agents. Besides all necessary laboratory tests a wide range of products is available. Here you will find a brief overview on the possibilities of the use and the efficacy of products.



Unfortunately, papermakers often find materials in paper production which entered the system unintentionally and have undesirable effects. They are generally known as impurities. Trends such as increasing closures of paper machine circuits, rising process temperatures and increasingly difficult raw materials (such as DIP, TM) intensify their harmful effect.

The most common unwanted side effects are:

- negative effect on chemical additives,
- negative effect on quality parameters such as strength, holes etc.
- the formation of deposits and consequently a negative influence on production and quality.

To avoid disruptions in production one tries to remove the impurities or to make them harmless with chemicals. There are different problem solving strategies, which often have to be combined to achieve sustainable success. Of particular interest are:

- Mechanical cleaning with sorters and cleaners
- Fixation within paper and therefore discharge via paper
- Masking or removal of stickies
- cleaning of circulating water.

To find the optimal strategy, some preparatory work is needed.

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First, the origin and properties of the impurities are determined. In practice, the origin is identified with a system analysis. Samples are taken from the stock and the impurities potential is determined with different methods. Standardly determined are: turbidity, charge titration, pH- value and conductivity and, if needed, the COD. These values provide indirect information on the system conditions. The following methods provide a more precise determination:

- Chemical analysis of deposits
- Extraction
- Selective colouring
- Sorting and sheet evaluation in the laboratory

• Laser fluorescence analysis

In general, the main sources can be divided into groups.

The treatment strategy must be selected according to the properties of the substances and their occurrence.

Classification of impurities

There are two main groups of impurities: the so-called "anionic trash"(=real or colloidal dissolved anionic polymers) and the so-called "pitch" (= non-ionic hydrocolloids of different origins).

These substances can originate from various areas, such as:



- Deinking: sodium silicate
- Filler dispersion: poly acrylates, polyphos phates, etc.

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- Coated rejects: starch derivatives, binder etc.
- Pulp: organic acids, hemicelluloses, resins
- Fresh water: humic acids

Also by an improper use of aids "impurity problems" may arise; for example ASA deposits and the like.

The mechanism of the formation of deposits can be summarized roughly described as a problem of hydrophobicity. In water, very hydrophobic particles tend to aggregate into larger particles or to attach to non-polar surfaces. If very large particles are formed, usually they will be easily mechanically separated. On the other hand very hydrophilic particles dissolve molecularly in water. Particularly difficult are substances with both hydrophobic and hydrophilic properties. They will not really dissolve and they can form only small aggregates. Therefore it is difficult to separate them mechanically. Faults in the structure by pH jumps may lead for example to precipitation and deposits. Another important factor is the interaction with various surfaces such as fibres and fillers as well as with screens and other machine parts.

The solution of problems with impurities: A combination of technology and chemistry

The elimination of impurities results from their physical and chemical properties as well as from their origin and their nature. The most efficient method is always a functional interaction of technology and optimum chemistry.

First and foremost stickies have to be mechanically separated. Macro stickies with sizes over 100 microns are separated by sorting.

With ENESSCO INT., Applied Chemicals offers an appropriate new product, which supports the agglomeration of stickies and improves sorting.

All subsequent separation processes are positively influenced by ENESSCO INT.

Due to various process steps there is still always the risk that secondary stickies are formed or that colloidal systems are destabilized. Therefore, further measures have to be taken to reduce impurities.

An overview of possible procedures is given below:

- Dispersion: of very small particles: risk of reaggregation and secondary formation of stickies.
- Micro flocculation: formation of microflocks and subsequent discharge by flota tion reduces drastically the impurities po tential in cycles
- Adsorption: bentonites may adsorb in par ticular non-ionic substances, which can be easily removed
- Fixing: using cationic fixing agents anionic charged substances can be fixed onto fibres and therefore they are discharged with the paper.

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Applied Chemicals offers all necessary laboratory work as well as a comprehensive range of additives.

Our application engineers can also provide information on the interactions between the various additives.

We would like to advise you personally. Our application engineers are at your disposal and they also provide on-site support.

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