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**Research area: Process aims**

Paper and paperboard production // Surface treatment

**Key words:**

Coating colour, drying, energy

**Title: Targeted use of coating colour components to reduce the energy demand in paper drying.****Background/Problem area**

Saving energy when paper coating is dried has been the focus of many investigations and is of growing importance with the rising costs for oil, gas and electricity. Reported ways to save energy are mostly found in constructive measures to guide the drying air and in a local control of temperature and heat conduction.

Another approach seems to be feasible, i.e. to optimize coating colour composition in order to increase the efficiency of using energy for water evaporation. Small shares of speciality pigments with most effective energy absorption have shown to be capable to reduce the required energy input to wet paper coating significantly without affecting surface quality in the end. Various substances are planned to be investigated as coating components in order to influence energy absorption and water bonding. Additives that influence the structure of the coating colour and the coating layer, like thickeners and water retention aids, are expected to influence energy demand, as well as caotropic substances which increase the mobility of water. Depending on the drying strategy, the use of energy absorbers appears to be an additional way to reduce the required drying energy.

**Objectives/Research results**

The objectives of this project are to determine the interrelations between

- energy absorption of coating colour components and
- structure, drying time and drying speed of coating colours.

The interrelations should be used to lower the energy demand of the drying process of coated paper. They should be used also as a basis for the development of new coating colour components. The chemical industry, which for speciality products often is structured in small and medium sized companies, shall derive new products for a more efficient and ecologic and economic paper making process and possibly also printing process.

In the first stage of the investigations an experimental setup was developed for measuring the drying kinetics of coating colours and their components. In a second step a representative selection of pigment slurries, binders and additives were investigated. Despite some difficulties in measurements it was shown that the drying kinetics of these compounds could be explained by their chemical and physical structure. Based on the findings in the laboratory pilot trials were carried out. They have shown that besides solids content the energy consumption and efficiency can be influenced by

- Addition of IR absorber pigments
- Structure and nature of the added starch pigments

To a lesser extent energy consumption can be influenced by the types of thickeners and rheology modifiers. Some of the effects observed were very small and will need a better clarification in follow up projects.

**Application/Economic benefits**

In the value chain, the paper industry is located between machine and process design and chemical industry on the one hand and the printing industry on the other hand. Advantages and measures for these branches are e.g.:

- Companies of the machinery and process design industry can adapt their technology to the new materials and broaden their portfolio.
- The chemical industry can come up with new materials and use this competitive edge for conquering new markets.
- Paper and printing industry will have to use any possibility for lowering their production costs in order to stay on the market. Lower costs for drying are expected to play an even more important role in the future.

**Project period: 01.03.2008 – 31.05.2010**

**Remarks**

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