Optimisation of coated packaging papers for flexographic printing.

Background/Problem area
In the last few years, offset printing as the dominant printing technique in the production of coated packaging papers has been in many cases replaced by flexographic printing. But coating formulations have not been optimised for this printing technique. In view of the composition of flexographic printing inks (low viscosity) the required pick resistance of coated papers could be reduced significantly. This in turn would lead to much lower costs for packaging papers, especially those made for flexographic printing, primarily because of lower binder contents. The limiting factor to binder content is a minimum strength of the coating layer for further converting of the papers that guarantees sufficient creasability and foldability and extensively prevents dusting, for example. In addition, sufficient adhesion of coatings and laminations that might follow must be guaranteed, too.

Objective/Research results
The objective of this research project is the optimisation of coated packaging papers, especially papers for flexographic printing. It means in particular the development of optimised coating formulations to achieve optimal flexographic print quality and also the development of low-priced coating formulations with reduced binder contents and guaranteeing/optimising the converting properties of these papers at the same time.

To achieve the above mentioned objectives, twelve commercial available packaging papers were examined to obtain orientation values of paper surface properties which were relevant for optimal flexographic print quality. Several paper manufacturer and printer were also interviewed about the relevant paper surface properties. The most important paper surface properties are surface smoothness (1.5 – 2.5 µm), surface energy (≥38 mN/m) and a high micro porosity. To achieve this surface values successive coating trial series on a laboratory scale were conducted including different pigments and binder contents. The paper samples coated with developed coating formulations were printed at laboratory scale using a small flexographic printing machine. The achieved print qualities were then correlated with the paper surface properties to verify the above mentioned results and to define coating colour formulations for the pilot coater trials. The converting properties (creasability, foldability, gluability) of the coated paper samples were examined to guarantee the usability as packaging papers. A natural fine calcium carbonate pigment with a narrow particle size distribution enabled the required values for surface smoothness and micro porosity. The required surface energy could be achieved using an adequate synthetic binder. The binder content in the coating colour formulations could be reduced up to 8 parts without impairing the convertability of the papers. In the meantime the pilot coater trials and also the printing trials with an industrial flexographic printing machine have been carried out. At present the coated and printed paper samples are evaluated with regard to print quality, surface properties and convertability.

Application/ Economic benefits
The innovative thrust of the research results to be expected lies in improving the cost structures of high-grade, coated, flexible packagings. The manufacturer of coated packaging papers and corrugated boards with coated liners will be given recommendations for optimised coating colour formulations that are especially suitable for flexographic printing. At the conclusion of the project, a test routine is to be worked out to evaluate coated papers in respect of their suitability for flexographic printing. Pilot plant trials will ensure the applicability to industrial processes and scale-up to industrial conditions.

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