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Research area: Product aim

Paper, paperboard and board // Graphic papers

Key words:

Simultaneous Printability, print quality, Offset, Inkjet

TITLE:**Computer assisted development of coating concepts for the optimisation of print quality by simultaneous application of offset, flexo and inkjet printing****Background/Problem area**

In the advertising industry but also in the packaging industry the market for printing products with more personal and individual elements is steadily growing. To satisfy the requirements of their customers printing shops were more and more interested in digital printing machines. Thereby the developing potential of inkjet printing is rated very high because inkjet printing heads can be easily installed in conventional printing machines and will be a valuable add-on for the production of individualised products. In the near future these developments in the printing industry will have a significant impact on paper qualities.

Today paper qualities and paper coatings are optimised for only one printing technology. They are not able to handle simultaneously the different types and amounts of fluids in offset, flexo and inkjet printing inks. Especially by combining offset or flexo with inkjet printing appropriate drying of the printing inks and high print quality cannot be assured.

Objectives/Research results

The aim of the research project is to develop coating concepts for pigment coated paper qualities which are printed simultaneously with different printing methods especially offset, flexo – and inkjet printing. During the project work was focused upon the combination offset with inkjet printing.

At the beginning printing trials with commercially available papers were carried out to determine the current status of print quality in offset, flexo and inkjet printing. Afterwards coating layers with different porosities were applied on two different base papers and one plastic foil. Furthermore coating layers with different porosities were combined to make a multilayer approach. The samples were investigated by microscopy and tested in respect of surface tension, porosity and ink penetration. Based on this results standard coating colours for offset and flexo printing were modified to improve their inkjet printing properties. Test methods for ink penetration were developed and used for testing the manufactured samples. Parallel to the laboratory trials simulation models based on commercially available FEM-Software were developed and tested out on the basis of the experimental data. The results were used for the development of surface structures with appropriate ink penetration properties. Finally pilot trials were performed. The produced samples were used for testing offset and inkjet printability under practical conditions.

It was demonstrated that through the addition of speciality pigments with high porosity and large inner surface to offset coating colours penetration of printing inks could be adjusted in such a manner that with offset and inkjet printing good print quality could be achieved.

Ink penetration in offset and inkjet printing was characterized comprehensively with test methods developed within the project. The test methods were based on the Fogra counter-print method for offset and on the Bristow-Wheel and the PTS Datamatrix code tester for inkjet.

The kinetics of ink penetration in one and multilayer structures could be successfully predicted by the developed simulation methods. In the case of multilayer structures the penetration process in each single layer could be illustrated. The behavior of fluids with low and high viscosities was clearly different and was largely consistent with experimental observations.

Application/Economic benefits

The results of this project should have a positive economic influence on all industrial sectors along the value chain of print and packaging products. They can perform important contributions for the formation of new business fields along the value chain, namely

- In the paper producing industry through new paper qualities with highly flexible printing properties
- In the chemical supply industry through raw materials and additives which are necessary for producing such paper qualities.
- In the printing industry through new print products like personalised advertising brochures, instruction booklets and packaging.
- In the packaging industry via products which can be quickly marked with inkjet printers.
- In the supply industry of the printing industry through new printing machine concepts.

Period of time: 01.07.2010 – 30.06.2013

Remarks

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